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CONTENTS OF THIS ISSUE

1917

		PAGE
THE HANDLING OF HAZARDOUS GENITO-URINARY RISKS FOR OPERATIONS UNDER ANESTHESIA	Moses Salzer, Cincinnati, Ohio	2
SOME OBSERVATIONS ON THE RELATION OF BLOOD-PRESSURE TO ANESTHESIA	Mary V. Madigan, Portland, Oregon	3
ANESTHESIA AND ANALGESIA IN THE CURRICULUM, THE CLINIC AND PRIVATE PRACTICE	Hugh W. MacMillan, Cincinnati, Ohio	6
HANDLING EMERGENCIES UNDER ANESTHESIA AND ANALGESIA	N. T. Yager, Louisville, Ky.	7
ORAL AND SINUS SURGERY UNDER N_2O-O ANESTHESIA IN THE FORWARD-INCLINED POSTURE	Ira O. Denman, Toledo, Ohio	9
EXTRAORAL CONDUCTIVE ANESTHESIA FOR ORAL SURGICAL OPERATIONS	Kurt H. Thoma, Boston, Mass.	14
ORAL HYGIENE IN RELATION TO ANESTHESIA, ANALGESIA AND THE ANESTHETIST	Bion R. East, Detroit, Mich.	21
SIX MONTHS' WORK IN ANESTHESIA	Alma Vedin, New York City	30

DEPARTMENTS

EDITORIALS	27	SOCIETY PROCEEDINGS	29
BOOK REVIEWS	26-28	QUARTERLY INDEX	32

THE HANDLING OF HAZARDOUS GENITO-URINARY RISKS FOR OPERATIONS UNDER ANESTHESIA.*

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In the consideration of any questions on anesthesia, the anesthetist should not confine himself to the actual administration of the anesthetic itself. It should be his aim to have his patients leave the hospital well and he should take such measures before, during and after the operation as will insure the recovery of the patient. He should not feel that his task begins and ends on the operating table. He should be as keen to effect the ultimate recovery of the patient as the surgeon. It is in this spirit that I approach the subject of the handling of hazardous genito-urinary risks. You will pardon me, therefore, if I have so little to say about the actual administration of the anesthetic itself.

In no branch of surgery does the successful outcome of an operation depend so largely upon the proper handling of the anesthesia as in genito-urinary work, as all cases are either actually or potentially hazardous risks. Those cases not considered hazardous before the operation may quickly become so.

The proper handling of these cases may best be considered under three headings, (1) the preparation, (2) the actual administration of the anesthetic itself, and (3) the after-treatment.

THE PREPARATION OF THE PATIENT

In other branches of surgery, I believe the quicker the ordeal is over and the less the preparation, the better, but not so in this class of cases. Barring strictly emergency conditions no patient should be operated upon without making a careful functional test, preferably the phenosulphonethalein. If the test is low, and many of our cases tested as low as 1 per cent. during the first hour, rest in bed, increasing the fluid intake by giving vichy or any other alkaline water, and careful attention to the diet may improve conditions. That measure, however, to which we have pinned our faith and which has proven most efficacious in our hands in increasing the output, steadying it and improving the patient's general condition, has been the thorough alkalinization of the patient. The urine should be persistently alkaline to methyl-red. Of course an alkaline urine due to ammoniacal decomposition is to be guarded against. They are given alkalies by mouth or, if necessary, by rectum or even intravenously. These patients get not one drop of water that is not alkaline. It is remarkable how under this treatment, the urinary output increases and how cases, otherwise hopelessly unfit for operation, are successfully operated upon. Whatever difference of opinion there may be as to the treatment of an established nephritis by Fischer's methods, there is no question, in my mind, that as a prophylactic in genito-urinary surgery it stands alone and its value is incalculable. In 1903 Sollman, in the American Journal of Physiology, Vol. 9, 461, said: "In the light of these experiments, the superior diuretic action of hyperisotonic solutions is explained by their causing a shrinkage of the cells, and through this, increasing the lumen of the blood-vessels, and hence the rapidity of the circulation." So, therefore, despite the fact that sensory stimuli arising in the urinary tract do cause a vasoconstriction of the kidney vessels we shall have anticipated and overcome this very serious complication.

If the patient's bowels move regularly every day they will need no attention. If they do not, any of the saline cathartics may be used to insure daily evacuations. Drastic purgation is decidedly harmful. No cathartic should be given the night before the operation, but the bowels should be emptied the morning of the operation by an enema. I think it is bad practice to give a cathartic the night before any operation, as it simply tends to make the bowels uneasy following the operation and to cause many of the *gas pains*. It must not be forgotten that cathartics interfere not only with the normal interchange of fluids between the circulation and the bowel, but that the absorption of gases is also interfered with.

The blood pressure should be closely observed and every effort should be made to bring about as normal a condition as possible.

It is evident from the above that no definite time can be set for the operation. We do not hesitate even after the time is definitely determined upon to postpone the operation at the last minute, if, in our judgment, the patient is not in as good a condition as we believe it is possible to get him.

On the morning of the operation the patient is allowed to drink as much vichy water as he may desire up to within a half hour of the time set for operation. About an hour before the operation we usually give a quarter of a grain of morphin and 1/150 of atrophin or the patient is given two hypodermics of an 1/8th of a grain each at an interval of a half hour. I personally prefer giving

*Read during the Second Annual Meeting of the Interstate Association of Anesthetists, Louisville, Ky., July 26-27, 1916.

the two doses. We have tried as a preliminary narcotic codein, by rectum and hypodermically, heroin and pantopon, but have always returned to morphin.

THE ANESTHETIC ITSELF.

Local anesthesia is to be used, of course, wherever it can be used to advantage. I do not believe that it should be used in any case where it would materially lengthen the time of operation or interfere to any extent with the various manipulations necessary in the performance of the operation. Its field is very limited.

When it comes to the question of a general anesthesia, there is but one anesthetic that should ever be considered, and that is nitrous-oxid oxygen.

Spinal anesthesia has deservedly fallen into disrepute wherever nitrous-oxid oxygen is available.

THE AFTER-TREATMENT.

The after-treatment consists again in the pushing of the alkaline waters. As soon as the patient is conscious, which occurs almost immediately after a nitrous-oxid anesthesia, the patient is allowed to have vichy water. Rarely, if ever, is there nausea following a nitrous-oxid oxygen anesthesia and consequently the intake of alkaline waters can be pushed from the start. Fischer's solution is given immediately per rectum by the drop method and is continued as long as it causes the patient no discomfort, but is started again as soon as possible.

Pituritin hypodermically and Fischer's solution intravenously are our mainstays should there be the slightest evidence of impending shock or scanty urinary secretion following the operation.

Suprapubic prostatectomies in old men are hazardous enough, I believe, to suit the most critical. Up to the time of writing this paper, of 43 consecutive suprapubic prostatectomies, in which the patients had been prepared as outlined above, all left the hospital well excepting three. One died on the second day from acute peritonitis. One died on the 14th day from acute mania. This case was an exceedingly bad risk and showed some mental symptoms before the operation. The third patient dropped over dead on the 15th day as he was stooping over to put on his slippers.

Our cases have been strikingly free from postoperative complications of all kinds. In only four cases out of the whole series was there any nausea or vomiting at all, which is an important factor, when one wishes to push the alkaline waters by mouth. In no case following the operation was there enough disturbance of the urinary secretion to cause us any alarm. There was absolutely no complication on the part of the respiratory tract in any case. Fifteen of these patients were over 70 years of age, one being 86, and he recovered, 18 were between 60 and 70 and the remaining 10 cases were below 60.

Dr. George F. McKim operated upon all of these cases and I wish to thank him and his associate Dr. A. E. Koch for valuable suggestions and the privilege of reporting these cases.

60 Groton Bldg.

SOME OBSERVATIONS ON THE RELATION OF BLOOD-PRESSURE TO ANESTHESIA.*

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Since the first administration of ether in 1846 and chloroform in 1847, the advantages and disadvantages of each have been tested in laboratories and clinics, in skilled and unskilled hands, and while the dangers during administration and after are greater with chloroform than with ether, still chloroform is used and used extensively, and that because of desirable qualities which it possesses.

The patient goes under quietly, anesthetic sleep is complete and conduct during the operation is ideal from a surgical point of view. If we could eliminate its toxic features and sudden deaths, chloroform comes nearer to being an ideal anesthetic than any other. In view of the fact that chloroform is still being used we must conclude that the ideal anesthetic has not been found.

Nitrous oxid and oxygen with its advantages and enthusiastic following is so cumbersome, expensive and difficult of administration, as well as dangerous in the hands of anyone who is not an expert, that it cannot come into general use until it can be handled with simple apparatus and rendered safe by proper and definite control.

In regard to safety it stands in about the same relation to ether that ether does to chloroform. The patient goes under quietly, recovery is pleasant and it is less toxic than other anesthetics, but the disadvantages spoken of together with lack of relaxation are not easily overlooked.

Since ether has not completely supplanted chloroform because of its greater safety to the patient, so nitrous oxid and oxygen will not supplant ether simply on its virtues until its disadvantages are overcome.

In the surgical clinic at St. Vincent's Hospital, Portland, Oregon, ether by the drop method is used

*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916.

in every case. Blood-pressure, pulse and respiration are taken and recorded on McKesson charts. Notations are also made of each stage of anesthesia and operation. During the three years in which we have used these records, we have found that blood-pressure furnishes accurate information as to the condition of the patient, and that shock may be anticipated and remedial measures instituted in its incipiency.

1. According to Fairlie: "Little alteration of blood-pressure is produced by ether. It may cause a rise, it may maintain a constant level, or it may cause a fall. It causes more rapid and forcible cardiac action, with dilatation of the smaller vessels (as evidenced by the flushing which occurs), the latter probably counteracting the former in maintaining the blood-pressure level almost constant. With intercurrent shock a considerable fall of pressure takes place."

We have found that in the initial stage of anesthesia, at least, there are fairly constant changes in arterial blood-pressure—a rise during the initial stage and a fall to normal when surgical anesthesia is reached. These may be due, however, to emotion and excitement rather than to the anesthetic.

When the patient is brought to the operating room there is a rise in blood-pressure varying with his condition and temperament. The rise takes place in patients who have had an administration of pantopon gr. 1/ or morphin sulphate gr. 1/6 and atropin gr. 1/150 as well as in those who have had no preanesthetic medication.

On the other hand, during the administration of ether there is a gradual drop in blood-pressure from the beginning to the end of the operation.

In consequence of the arrangement of valves in the veins, contraction of the skeletal muscles forces blood toward the heart. During ether anesthesia these muscles are relaxed as well as the visceral muscles and this important factor in the movement of the blood is eliminated.

2. The movement of the blood into the thorax during inspiration due to lessened intrathoracic pressure is aided by the rise in pressure in the abdomen caused by the descent of the diaphragm. When the peritoneum is open pressure in the abdominal cavity cannot be raised by the descent of the diaphragm and another important factor in the movement of the venous blood is interfered with.

These two factors may explain the gradual drop in blood-pressure from the beginning to the end of ether administration in abdominal operations.

Besides the gradual fall in blood-pressure there is a sharp drop when the incision through the skin, intervening layers and peritoneum is made. During manipulation of the bowels to locate an appendix, or exploration for lesions in doubtful cases where appendicitis, gastric ulcer, or cholycystitis is suspected there is a sharp fall of pressure. Manipulations of the gall bladder or operations on the gall bladder seriously disturb the circulatory equilibrium, causing an immediate and decided drop in every case.

In one case during an investigation of a supposedly pathological condition of the kidney blood-pressure fell 100 mm. and climbed steadily though slowly on completion of the examination.

Removal of the appendix, for instance, cutting or suturing incidental to same is without effect on blood-pressure conditions.

Since low blood-pressure is the essential phenomenon of surgical shock it follows that the anesthetic, trauma of the peritoneum or abdominal viscera, particularly those closely related to the diaphragm, are shock producing factors when prolonged and in the handicapped patient must be carefully adjusted to fit the limitations.

The theories in regard to shock are many.

3. Crile believes that shock is due to exhaustion of the Betz cells of the cerebrum and the Purkinje cells of the cerebellum excited by stimulation of the sensory nerve endings. The block takes place somewhere in the afferent pathway. "The afferent path from the seat of injury being unbroken, the afferent stimuli reach and modify the brain-cells as readily as if no anesthetic had been given, and it would seem that the brain-cell changes must be due to the discharge of energy in a futile effort to escape from injury."

4. Sherrington claims that fatigue occurs first in the central nervous system and that the block occurs in the afferent side of the reflex arc, but presumably in the synapses. The seat of both excitation and of inhibition is not in the actual motor neuron itself, but in the synapse of the intermediate neuron connected with it. Since the seat of excitation and inhibition is in the synapses, fatigue must in all probability be here also. "The seat of fatigue is intraspinal and central more than peripheral and cutaneous, and affects the afferent part of the arc inside the spinal cord probably at the first synapse."

5. Seelig and Joseph conclude that "a paralysis or failure of the vasomotor centre is not the primary cause of the other symptoms of surgical shock," because in their experiments, in which the vasoconstrictor nerves to one ear are cut, comparison of the calibre of the blood-vessels of the normal ear during induced shock to those of the denervated ear show constriction of the peripheral arteries and not dilatation. The action of adrenalin being pre-

vented by the removal of the adrenal glands previous to the experiments.

6. Corbett's suprarenal exhaustion theory is based on reduction of the epinephrin content of the suprarenal medulla in animals reduced to traumatic shock and the development of symptoms similar to shock in animals deprived of suprarenals. Shock was produced earlier in animals in which the suprarenals had been removed.

7. Porter has found that stimulation of an afferent nerve will produce a rise of blood-pressure when the animal is in a condition of surgical shock.

8. In vasomotor reflexes Bayliss found that by stimulation of the central end of the depressor nerve blood-pressure was reduced to about half its height and remained at this level without change for 17 minutes. When stimulation was stopped previous blood-pressure level was restored immediately, showing that the centre was not fatigued.

9. Janeway and Ewing obtained abdominal congestion and shock upon handling the intestines when the CO_2 content of the blood was, by special means, not appreciably reduced, and suggest that a local paralysis of the vessels and intestines occur which accounts for the stasis.

10. Henderson by his acapnia theory shows that excessive breathing during anesthesia diminishes the CO_2 content of the blood, thereby causing apnea which may prove fatal, or the elimination of CO_2 may progress to more acute acapnia with consequent circulatory failure. The deficiency of CO_2 affects the veins, capillaries and tissues causing an extravisation of fluids out of the bloodvessels into the tissues with consequent diminuition of its volume or oligemia. A reduction of CO_2 content of the blood causes a greater passage of CO_2 from the tissues. For every CO_2 ion passing, two Cl ions migrate to the tissue spaces and in this way increase the osmotic attraction for water and induce the oligemia.

The results obtained by Lyon suggest that the blood does not accumulate in the splanchnic area in shock.

In regard to Seelig and Joseph's experiments, the removal of the suprarenals is of little value, as other chromaffin tissues in the body may to a certain extent, at least, replace the adrenals and supply epinephrin to the blood.

Corbett's theory will not suffice as reflex secretion of epinephrin is not necessary as an accompaniment of pressar reflexes which require also excitation of the vasoconstrictor centre. The chief function of epinephrin, secreted by the suprarenals and paraganglia cells, is to produce in smooth muscle a state of excitability or receptivity and to cause the cells of the liver and muscles to set free sugar.

The bulk of evidence in the work done to determine the nature of surgical shock seems to indicate that failure of the vaso-motor centre does not occur. With this point clearly settled and ephinephrin exhaustion not applicable it remains to be determined through practical clinical tests whether a reduction of venous tonus due to local paralysis, produces stasis, or an oligemia as suggested by Henderson occurs.

Since blood-pressure readings furnish an index of the condition of the patient, the steps in the development and progression of shock may be followed with the greatest precision, but the treatment is not adequate to allay or prevent it in all cases, nor is preventative treatment effective in all cases.

As stated above, low blood-pressure is the most serious condition of shock, therefore, the immediate treatment must be directed toward its restoration and maintenance. Although the cause of shock has not been determined up to the present time, Crile's anoci-association treatment aims to prevent the conditions which produce low blood-pressure.

The patient is not allowed to spend a restless night preceding the operation. Fear and excitement are allayed by morphin and atropin half an hour to an hour before anesthesia. Local anesthesia is combined with general to block the afferent impulses. In this connection Dr. Weiner's recent report of brilliant results in a series of fifteen cases of appendectomy, under local anesthesia alone, is of interest.

When shock has developed efforts are made to prevent its progress, also to restore and maintain blood-pressure level at or near normal. Epinephrin in saline solution 1-50,000 or 1-100,000 intravenously. The saline restores the volume of circulating fluid and the epinephrin causes a constriction of the arterioles. The administration should be slow, as the rise is only temporary and the salt solution very quickly leaves the bloodvessels.

Strophanthin also given intravenously produces a slowing and strengthening of the heart and a prolonged rise of blood-pressure. Improvement takes place, however, half an hour after administration but continues for fifteen to twenty hours.

Camphor, unlike the other local irritants, such as alcohol and ether, produces no bad after effects and should be used for its immediate beneficial effect. As atropin is a slowly acting drug it should be given for its remote effect, if it has not already been given previous to the anesthetic.

The head should be lowered in all cases to prevent

anemia of the brain and artificial respiration resorted to when required.

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ANESTHESIA AND ANALGESIA IN THE CURRICULUM, THE CLINIC AND PRIVATE PRACTICE.*

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Mr. Chairman, Members of the National Dental Association, Members of the Interstate Association of Anesthetists, and Guests:

This is truly an auspicious occasion, and one teeming with great opportunities for the future. This is the first time in history that two important organizations representing the medical and dental professions have met on equal terms to discuss vital subjects of common interest. This is the moment to which leading thinkers of both professions have eagerly looked forward, and in this common meeting their ideals, so fondly cherished, are consummated.

It is particularly fitting that this reunion occur in the discussion of the subject of anesthesia. No greater gift has been given to humanity than the wonderful endowment of the loss of sensibility to pain. It seems hardly possible to younger men in the profession that the first general anesthetic, nitrous oxid, was administered only seventy-two years ago. In the days of our grandfathers, cracked ice, Indian hemp, opium and alcohol were the agents used to diminish the agony of the suffering. In these days of modern surgical procedures, by the aid of trained anesthetists and by the employment of anesthetics best suited to the case, operations can be performed which were not dreamed of seventy-five years ago.

As a coincidence of this common meeting, it is an interesting fact that dentists and physicians have shared equally in the discovery and early development of anesthesia. In Hartford, Connecticut, a tablet was erected on the wall of the building now occupying the site of the building in which Dr. Horace Wells's office was situated. The tablet bears the following inscription:

ON THIS SPOT HORACE WELLS, DECEMBER 11, 1844, SUBMITTED TO A SURGICAL OPERATION, WHEREBY HE DISCOVERED, DEMONSTRATED AND PROCLAIMED THE INESTIMABLE BENEFITS OF ANESTHESIA.

There is also a monument in Hartford to Wells erected by the State of Connecticut and the City of Hartford. The citizens of Boston erected a marble monument to Morton in Mount Auburn Cemetery with the following inscription:

WILLIAM THOMAS GREEN MORTON, INVENTOR AND REVEALOR OF ANAESTHETIC INHALATION, BEFORE WHOM IN ALL TIME SURGERY WAS AGONY, BY WHOM PAIN IN SURGERY WAS AVERTED AND ANNULLED, SINCE WHOM SCIENCE HAS CONTROL OF PAIN.

In the present day, members of both professions are equally prominent in the administration and research work connected with this great subject.

Reading from the constitution of the Interstate Association of Anesthetists, we learn that:

"The objects of this association shall be to advance the science and practice of anesthesia and analgesia; to promote the teaching thereof and to conserve the interests of anesthetists."

Its members are composed of licensed practitioners of medicine and dentistry, interested in anesthesia and analgesia.

It has been asked what advantages would the general practitioners of dentistry derive from being a member of this society.

It becomes the unwritten obligation of every individual entering a profession to strive to make that profession the better for his presence. The watchword of today is *service*. Men more clearly realize the truth of the old saying:

"What I kept, I lost;
What I spent, I had;
What I gave, I have."

One of the objects of this association is to establish the teaching of anesthesia and analgesia in the curricula of all medical and dental colleges. The great majority of graduates enter the practice of their profession with no thought of advancing the methods or educational requirements of their pro-

*Read during the Joint-Session of the Interstate Association of Anesthetists and the National Dental Association at Louisville, Ky., July 26-27, 1916. Chairman's Address.

fessional schools. They daily witness shortcomings in the education of future associates without even suggesting better plans or endorsing those men who are working for better conditions. The status of a profession is not in the ideals of that profession, but in the general average of its members. One of the greatest pieces of service which the individual dentist can render is to obtain membership in this organization and insist that the education of dental and medical students in anesthesia be improved. Until all professional schools are run for the benefit of humanity and not for private gain, supervision of them is not only necessary but should be considered by each individual as his professional obligation.

Another opportunity for the general practitioner to advance the standards of his profession is to ally himself with a body of men which is striving to guide the legislators in the various states to pass laws which will truly serve the medical and dental professions as well as the general public.

It is of great interest to dental anesthetists to know that the Quarterly Supplement of Anesthesia and Analgesia was able to prevent a reprehensible propaganda against the dentists of New York State when, during the 1915-16 session of the legislature, an effort was made to differentiate the respective prerogatives of dental and medical anesthetists as a side issue to abolishing the unlicensed anesthetist.

This propaganda was in direct contravention to the newer spirit of amalgamating the interests of the allied professions, which is leavening the American professions of medicine and dentistry.

The Interstate Association of Anesthetists at this meeting has endorsed and will co-operate with the activity of the American Association of Anesthetists, which consists in a canvass of all the medical and dental schools, clinics and hospitals, with a view of standardizing methods of instruction and training in anesthesia and analgesia. While a number of dental schools have organized departments of anesthesia under competent instructors, there is still considerable room for improvement in corelating the theory and practice of anesthesia and analgesia to all branches of operative dentistry and to the physio-pathology of patients coming to operation.

Through the Quarterly Supplement of Anesthesia and Analgesia the association prints the papers presented at the meetings of the various organizations of anesthetists, and through the associations of which it is the official organ it is enabled to carry out constructive policies of reform. It is a noteworthy fact that in Georgia, Kentucky, Ohio and Michigan the state medical boards have already taken drastic action against unlicensed administrators of anesthesia, and other sovereign states are in line in putting the same restriction into effect.

One of the greatest advantages of this common meeting to the individual dentist is that it gives him an opportunity to learn improved methods and to obtain the latest information on the subject of anesthesia. The average medical or dental student is not prepared to pass a fair examination from the knowledge of anesthesia which he acquires during his college course. The medical student's knowledge is obtained by giving anesthetics in his interneship. The dental student memorizes sufficient answers to pass the state board. That this information, necessary to administer scientifically an anesthetic, can be obtained is evidenced by physicians and dentists of international reputation present here today who have educated themselves in this science. One of the greatest evidences of advancement in dentistry is the change of attitude regarding reading and studying. Laws which were supposed to be fundamental have changed until it is necessary to really study to keep within reach of these present day investigations. In this program of today methods never before written, illustrations never before shown in any text-book, will be presented to you by the speakers who are to follow.

The present high standards demanded by physicians and dentists demand the most efficient organization and cooperation to culminate its purpose. We must remember that each one of our professions is but a part of the vast mosaic of biology. We must sacrifice personal feelings and professional prejudices to the great cause of advancement in the science of life. Only by the aid of each individual can these things be accomplished, and may each be sufficiently recompensed by the privilege of doing his part!

UNION CENTRAL BUILDING.

HANDLING EMERGENCIES UNDER ANESTHESIA AND ANALGESIA.*

N. T. YAGER, D.D.S.,
LOUISVILLE, KY.

In considering this subject I am forced by experience to do so from the viewpoint of a dental anesthetist, as I have had no experience in the administration of an anesthetic for a major operation or other operations which would necessitate a prolonged anesthesia.

In my experience I do not think I have ever administered an anesthetic for a continuous period of over forty minutes. While it may be true the same

*Read during the Joint-Session of the Interstate Association of Anesthetists and the National Dental Association at Louisville, Ky., July 26-27, 1916.

remedies may apply in surgery, I can only speak from my own experiences in dentistry.

To my mind, if there is one person in the world who should be a *dyed-in-the-wool disciple of preparedness,* that person is the anesthetist.

A sign that I have seen lately has attracted my attention, and I should advise all anesthetists to at least make a mental drawing and let it ever stand before him.

WATCH SAFETY FIRST.

The unexpected so frequently happens that one should ever be on his guard, and when an emergency arises be prepared to act. After an accident is a very poor time to seek a remedy. The emergencies with which we have to deal are of such a nature that our notice is rather short, and the time to act is now.

To me it seems that the experienced anesthetist has a sixth sense, which is demonstrated by the fact that time and time again there has been an approaching or threatened trouble which has been recognized and the remedy applied without any evidence of a conscious thought by the anesthetist. This subconscious act may have been brought about by the thorough preparation of the anesthetist, coupled with his experience.

One of the best ways of handling emergencies is to be able to recognize their approach and apply preventatives. While it may be that all of us may not attain to the point of perfect efficiency, it is our privilege, and also our duty, to take every precaution and to make all possible preparations to properly care for those who have shown confidence enough in our ability to place their life in our hands. The *question* is, How?

In the first place, the best moral, physical and mental training obtainable would make a splendid foundation.

A moral man is trusted. One with a pleasing personality inspires confidence, and the mental training is the special weapon with which to fight and win.

By mental training, I mean the knowledge of conditions that exist from which an emergency may arise; the recognition and application of the treatment for these emergencies, and contraindications.

A thorough understanding of human nature is a valuable asset to those who possess it even in a small degree.

The emergencies that may and do arise are from three causes:

(1) Mental and physical condition of patients.
(2) The anesthetic.
(3) The nature of operations.

First, the proper preliminary preparations, as to diet, time of operation and assurance, is invaluable.

The control of the *second* is naturally a thorough understanding of the agent used, its physiological action and its proper administration.

The *third* is proper technic; control of hemorrhage, saliva, props and particle of teeth and debris.

I hardly think it necessary to call attention to, only in a brief way, of the agents necessary in handling emergencies that may arise, and I only refer to them in passing: Tongue forceps, mouth gag, hypodermic, cotton tampons, nitrate of amyl, whiskey, brandy or light wine, aromatic spirits of ammonia, strychnine sulphate 1-20 to 1-60, and, needless to say, a knowledge of methods of artificial respiration.

Syncope and cessation of respiration, dropping back of tongue, accumulation of saliva, blood or vomit has been the only conditions, fortunately, that I have been called upon to handle. And these cases responded very readily to the simple remedies, such as lowering the head, applications of cold cloths and administration of stimulants, cleansing out the mouth and throat and resorting to artificial respiration.

I have had most of my trouble from mucous in the throat, and, in the preliminary examinations, should I find the mouth containing that characteristic frothy, stringy saliva, I require the patient to cleanse out the mouth with cold water and then take two or three swallows. I think this treatment has been beneficial.

I have seen a few such cases during analgesia produced by the dust from the teeth excavated, a preventative measure in operations of this character being to pack lightly the posterior of the mouth with moist gauze.

In all cases of excessive accumulation of saliva, blood or moisture in the mouth, discontinue the anesthetic, let the patient come out. Cleanse out the mouth and throat well before attempting further procedures.

I believe it would be well, even in major surgery, to use a mouth prop. This would enable the anesthetist to cleanse out the mouth or throat instantly without having to take the time to introduce a gag, which, in some cases, would be difficult on account of the contraction of the muscles. It would also enable him to grasp the tongue easily if found necessary.

A capable assistant I have found to be of great value. I have had for some time a graduate nurse who has been of great service to me, not only in calling my attention to unfavorable symptoms and assisting in emergencies, but by handling the patient in such a way as to relieve their mind of fear and anxiety.

ATHERTON BUILDING.

ORAL AND SINUS SURGERY UNDER NITROUS OXID-OXYGEN ANESTHESIA IN THE FORWARD-INCLINED SITTING POSTURE.*

IRA O. DENMAN, M.D.,
TOLEDO, OHIO.

Philosophize as we may upon the mystery of human life; speculate and theorize upon the plan of existence; be we orthodox or evolutionists, the predominant fact is, that we are here on earth for an indefinite period, and that our residence here is pleasureable and profitable or the contrary, according to numerous conditions in and about us.

The range and variation of the human race are so great that there are but few things common to all men. Some one said that the six feet of earth is the common level, but before that state is reached there is a proposition upon which all men, great and small, rich and poor, learned and unlearned, may unite, and that is that good health is the greatest blessing of life. Health is more to be desired than anything else in the world. True, it must often be impaired or lost in order to be appreciated, but, when lost, its regaining becomes the supreme object in life. Fortunes, great and small, are laid down at its shrine. Sickness and death are terms which strike terror to the hearts of all men. Nature's strongest instinct is self-preservation. It pervades all form of life. To it is due the perpetuation of all life. This instinct is predominant in the human species. We call the antithesis of health, disease. The guardian of health and the relentless foe of disease is the physician.

If, then, it is given to us—and I beg to be understood to include under the term *physicians* all who labor in the field—under whatsoever heading—be it internist, dentist, anesthetist, surgeon, ophthalmologist, laryngologist, or the family doctor; if, as I say, it is given to us to foster and protect the thing of supreme value to all classes of people—should we not feel proud of our calling, and see that such pride is not unmixed with a due sense of grave responsibility which assume to our fellowmen upon donning the mantle of the greatest of all professions.

The age of truly great progress and scientific accomplishment in medicine and surgery dates from the discovery of anesthesia and bacteria. True, there are many diseases which are not due to bacterial action, but in this discussion we shall only consider those conditions which arise from infections, and some of their surgical requirements. Again, we find a division of infections as to their origin, either within or without the body, into exogenous and endogenous.

In recent years we have heard much of focal infections, and today we are endeavoring to measure their far-reaching effects and to cope with some of them surgically.

The profession generally owes much to the dental pathologist for his pioneer discoveries and invaluable contributions to this very important question. In fact, I wish that I might pause here and pay a fitting tribute to the American dentist, who so far outshines his European colleague as the sun does the moon. Whose prowess no longer lies in the celerity with which he can separate one from his *ivories,* in which age his highest ambition was to become notorious as the *lightning dentist,* but who now seeks to excel in prophylaxis, and finds his chief delight in preserving to us that which his predecessor could only extract.

May I say, further, that to my mind the dentist is really a specialist in the field of medicine and surgery, having in his special care the oral cavity—the gateway to the alimentary and respiratory tracts and so of infinite importance.

The almost marvelous progress of dental science in America is better realized when we reflect that less than two centuries ago the blacksmith was the tooth extractor, while the barber honed his razor to perform phlebotomy, from which practice the modern tonsorial sign gets its blood-red stripes.

Only recently the writer was told by a guide in Boston of the versatility of Paul Revere, who, before his famous ride, had achieved local prominence through his skill as a silversmith, goldsmith, coppersmith, blacksmith and dentist.

The anesthetist called in upon those occasions is not described, nor even mentioned, but no doubt he or they were the Jess Willards and Frank Gotchs of that period. No less striking contrast is presented in the field of anesthesia, from the patient being brutally held upon the table by pugilistic strength, to the calm, peaceful slumber for hours, if need be, under modern scientifically controlled anesthesia—represents the two extremes.

The surgeon must be mindful of the invaluable assistance of the anesthetist to whose achievements in his field surgery owes so much.

Returning to our subject, we know that in points of lowered resistance occur culture beds for bacteria. Some locations for these are the alveolar processes; the tonsils and the nasal accessory sinuses. Pathogenic micro-organisms here find the requisites for their propagation—warmth, moisture and pabulum—when such points become veritable hotbeds for the breeding of disease.

*Read during the Joint-Session of the Interstate Association of Anesthetists and the National Dental Association at Louisville, Ky., July 26-27, 1916.

The infection invades the lymph and blood currents, polluting the same, and the vital organs are thus supplied by a devitalized and impoverished stream. In time the individual's health is impaired, either by a general inefficiency of the bodily functions or by the direct entrance of some definite disease.

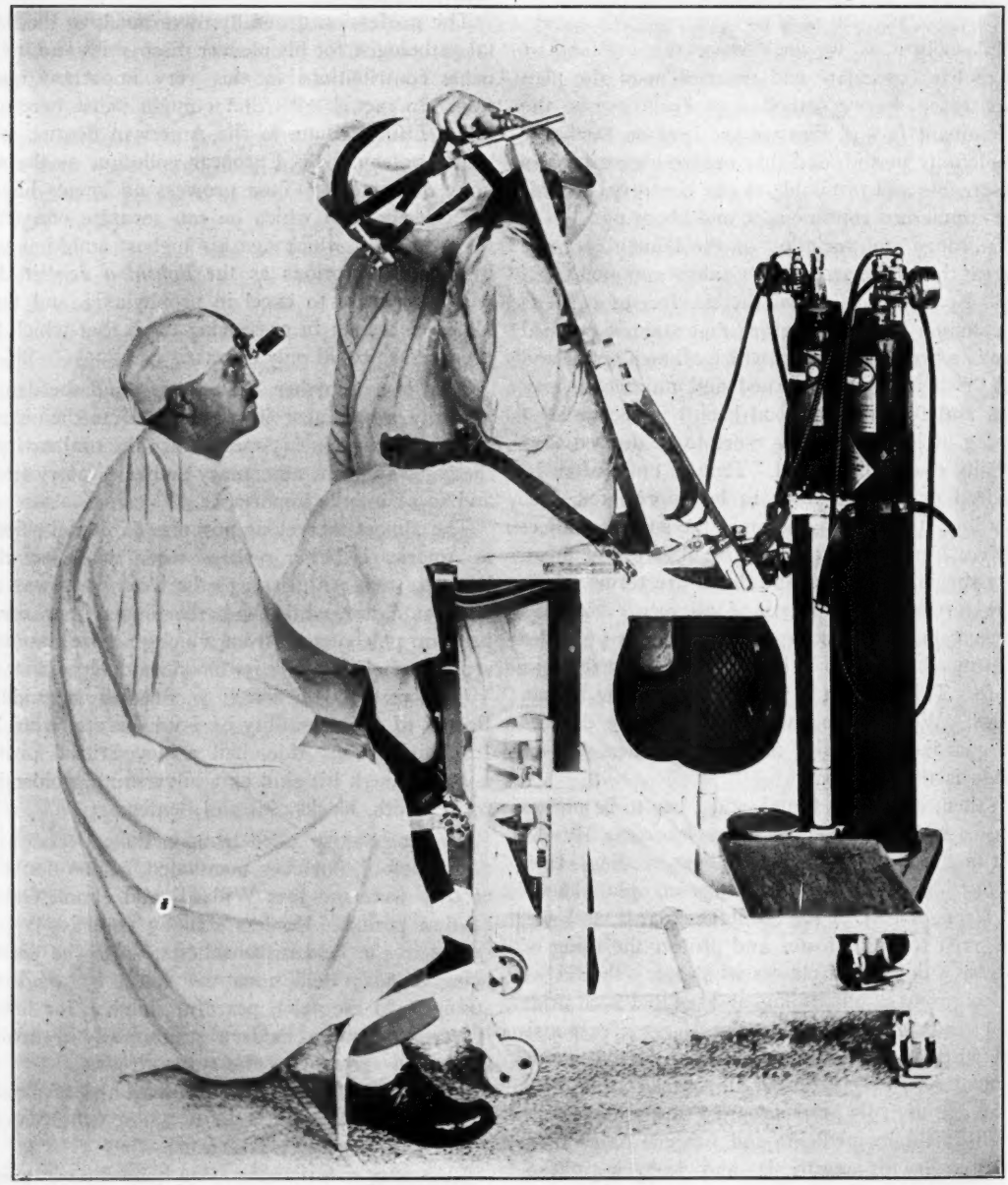

Figure 1. Illustrating the Author's Tonsillectomy Position. The Forward Inclined Sitting Posture for Nose and Throat surgery. Continuous nitrous oxid-oxygen anesthesia being used. (Sterile dressings are omitted to show retaining straps.)

This is the age of sanitation and prophylaxis in medicine. The whole trend of scientific endeavor is towards prevention rather than cure of disease. A gigantic wave of instruction to the laity, such as the world has never seen, is now sweeping over the country, teaching the people how to keep well. Columns appear daily and weekly in the public press, and these silent monitors do much in the humblest homes to diffuse the light of knowledge concerning the paramount issue. Much of such literature properly conveys to its readers the essentials of pure air, sunlight, good food, proper clothing, exercise, clean streets and alleys and good drainage.

More minutely must we show them that in addition there are great dangers to be found within their own bodies. There are hidden foes—focal points of infection within the tonsils, sinuses and in the gums—which cause many diseases, such as rheumatism, endocarditis and tuberculosis, and we must *clean house* by eliminating from our own bodies such hotbeds for bacterial growth.

Modern surgical methods, under modern anesthesia, may, as it were, pluck the thorn from the flesh and not only lengthen the span of human life, but make for greater efficiency, health and happiness while we abide.

A well-known internist states emphatically that *"the removal of the focus of infection is demanded as a fundamental principle in the treatment of systemic diseases of the chronic type,"*, and, farther, *"to the now well-known relation of focal infections as a chief factor in the etiology of acute rheumatism, chronic deforming arthritis, gonorrheal arthritis, malignant endocarditis, myositis, myocarditis, septecemia of various bacterial types, tuberculosis, nephritis and visceral degeneration, we may add certain infectious types of thyroiditis, with or without hyperthyroidism, pancreatitis, acute and chronic, with or without resulting glycosuria, peptic, gastric and duodenal ulcer and cholecystitis."*

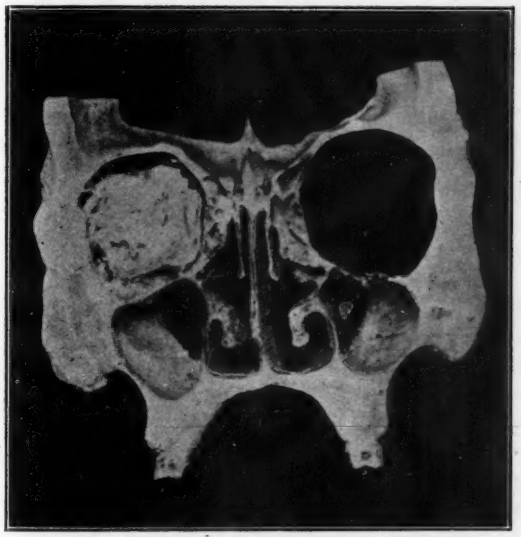

Figure 2. Cross-section of the bones of the face, normal specimen. Note the wide, free passage between the central walls and the middle turbinated body and septum.

Unfortunately, the recognition or diagnosis of the focal infection is not always an easy matter. If it were true that its presence were always a subjective manifestation, then more often would they be detected. On the contrary, however, there are often absolutely no local symptoms, such as pain or soreness, and thus insiduously is the patient's health undermined.

Alveolar abscesses are often unrecognized by the patient, and only film roentgenograms disclose their presence. Chronic sinusitis may exist for years unknown, and a large percentage of chronic tonsillar infections, which are so extensive as to ruin the health, frequently give no rise to sore throat.

The treatment of focal infections is essentially surgical, either to establish drainage and ventilation or to extirpate the infected tissue. I shall gladly omit those renal, appendiceal and other foci belonging to the general surgeon, from this paper. Neither shall I presume to discuss those of the alveolar processes before this body, but I shall limit my remarks to the sinuses and tonsils, which are of interest to dentist and rhinologist alike.

Figure 3. Cross-section showing a large middle turbinated bone which occludes the maxillary sinus osteum. This turbinate is hollow, containing an accessory ethmoid cell, and is a congenital malformation.

The nasal accessory sinuses are the frontal, ethmoidal, spenoidal and the maxillary or the antrum of Highmore. Physiologically they act as an auxillary to the nose in supplying moisture to the air we breathe. They also increase the resonance of the voice and strengthen and lighten the bones of the face. These cavities depend upon two things for their hygienic state: ventilation and drainage. Any deformity, injury or disease within the nose which interferes with the ventilation or drainage may prove to be the cause of an acute or chronic sinusitis. The ostea, or openings of all these sinuses, except the sphenoid, is found in one vital area of the nose; this is the hiatus semi-lunaris, or the

uncinate groove, beneath the middle turbinated bodies. This is called the *vicious circle* of the nose. It is here that most trouble often originates. Anything, such as septal deflections, congenital deformities, either of the septum or of the middle turbinate, or chronic catarrhal enlargements of the turbinated or new growths, polypoid usually in character, may obstruct the nasal ostea of the sinuses at this point. Such obstructions, if long continued, may result in chronic sinusitis. The ethmoids are usually the first affected, and the next the frontal, then the maxillary, and the sphenoid least of all.

The maxillary sinus, by reason of its peculiar position relative to the *vicious circle* being below it, and having its natural opening on a level with its

Figure 4. Cross-section showing a deflected septum, which partially obstructs the drainage and ventilation of the sinuses.

roof, is by its natural formation particularly susceptible to infections which gravitate into it from one or both of the sinuses situated above. Drainage is unfavorable from it because the secretions have to run uphill, as it were, to the ostium. Infected material, therefore, may be imprisoned in this cavity, which is a veritable trap for the dregs from the nose and other sinuses. At the most dependent portion of this sinus, and thus where the toxic matter would be expected to gravitate and remain, we find the roots of the teeth penetrate into the antrum cavity. These roots are covered only by mucus membrane. With this anatomy, dental surgeons are quite familiar, but dental pathologists have been too generous in accepting the majority of the responsibility for antrum infections, claiming as high as 75 per cent. of such cases arise from dental infections. That some cases do owe their origin to a primary dental-caries which break through into the antrum, there is no doubt. However, allow me to repeat that the maxillary sinus is an accessory nasal cavity having a natural opening into the nose, and not an accessory oral cavity. I have personally never seen a case of abscess of the antrum which did not present some signs of coexisting intranasal infection. Furthermore, given a case of chronic antrum infection, where there has been retention of toxic material for a long time, this material gravitating to the most dependent portion, which is the location where the roots of the teeth penetrate, I ask, is it not possible, or at least reasonable, to expect that such teeth may become infected *from* the antrum, and thus reverse the supposed order? Therefore, I wish to take the ad-

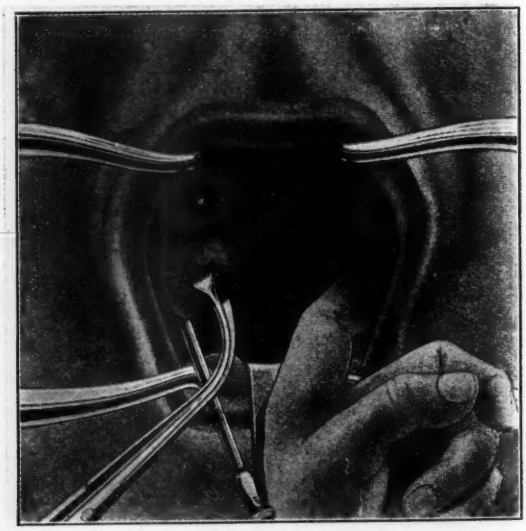

Figure 5. The author's tonsillectomy. A second tenaculum and snare are applied when the finger completes the dissection and both tonsils are simultaneously removed.

vanced position of relieving the dentist of much of the responsibility for the disease in this sinus, believing that dental infections are often secondary to nasal infections in this region.

Whether or not this suggestion meets with your approval, my next statement must go unchallenged, and that is, that the average dentist fails to take advantage of the opportunity daily afforded him to be a leader in the field of prophylaxis, so far as certain focal infections are concerned. Too often he thinks only of the alveolar foci. He should realize that his opportunity to discover also both sinus and tonsillar disease is almost enviable.

He sees diseased tonsils daily. He can, with the aid of a nasal speculum, see disease within the nose also daily. The nasal speculum should be a part of every dentist's equipment, and no dental examination should conclude without the inspection

of the nose and also the tonsils, not only as a diagnostic, but as a prognostic measure.

It is my deep conviction that the intent of all surgical operations should be to restore the parts as nearly to the normal state as possible, with the least disfiguration in sinus work, keeping in mind a statement made earlier in this paper, that the health of the sinuses depends upon drainage and ventilation; these we should first restore to a diseased sinus, with the minimum amount of the destruction of tissue.

I decry the wholesale disfiguring external operations of radical sinus surgery, and plead for conservative assistance to Mother Nature by intranasal procedures wherever such means give any promise of relief. No external mutilation of a patient's face is justifiable until after other measures have failed, and the removal of a sound tooth to secure drainage should not be the first procedure.

Intranasally, the region of the middle turbinate must be cleared and freed from pressure so that the sinus ostea may remain open. The middle turbinate must often be partially or wholly removed, septal deflections straightened, polypi removed and diseased ethmoid cells opened for drainage or removed if necrotic.

Surgery of the maxillary sinus, a subject in itself, can only be briefly mentioned. Freeing the natural opening alone is sufficient in many cases. This, together with a counter opening in the naso-antral wall beneath the lower turbinal, sometimes removing a portion of the antrum end of the same, cures the great majority of cases. Some chronic cases with granulations, polypi and septi requires a larger opening in the sinus wall to permit currettage and ocular inspection. For this there have been a number of methods proposed. Experience proves that the more the antrum is left as an accessory nasal cavity, that is, the smaller the opening in the naso-entral wall, the better. Large openings permit irritating substances from the air to maintain a constant irritation of the sinus lining membrane.

For the surgical treatment of nasal and sinus affections, I prefer nitrous oxid-oxygen anesthesia in the forward inclined-sitting position, to be described later.

The tonsil is, without doubt, the greatest offender in the whole field of focal infections. Tonsil tissues, especially after the activity of the gland ceases in early childhood, furnishes a most fertile culture bed for micro-organisms. Unlike most other locations, the focus is here accessible and permits of direct ocular inspection. Unlike sinus and alveolar processes, which permit only of drainage followed by therapeutic measures to restore the parts to a normal condition; in the case of the tonsil, the whole diseased mass is easily removed, thus eliminating at once from the body the source of toxemia. Unfortunately, we meet an issue in the tonsil question which is not encountered in any other infected region—not even now in appendicitis—the teleological question. Every day I am asked: "Why does nature give us tonsils if they are not for some use?" and "Should they not be treated and retained?" and "If a portion of the tonsil only is diseased, why remove the whole gland?" This last question is propounded also by physicians, and some specialists still advocate a tonsillotomy, at least they preform that operation.

An attempt to answer these questions here would be an imposition upon your patience, as it would mean opening up a question the discussion of which is almost as voluminous as was that regarding the appendix two decades past. The following statements, however, are regarded by the writer as facts, after careful observation: First, the tonsil function, if it has any, is preformed and concluded early in life. Its activity ceases by the eighth to the twelfth year, after which its decline begins and its tissues are incapable of repair. Second, like the man who says a thing cannot be done, is interrupted by someone else doing it, so those who declare that tonsillectomy should not be preformed are confronted constantly by its beneficial effects. I am speaking, of course, of diseased tonsils only which, through careful inspection by lifting the submerged tonsil out of its bed (and it is this variety most often diseased), an accurate diagnosis can be made. After the thorough removal of all tonsil tissue in its capsule, we note a certain and rapid improvement in health in every case.

To say, therefore, that tonsillectomy is overdone, simply because it is done frequently, is unwarranted. To say that it is poorly done, that it is attempted by men unfamiliar with its anatomical structure and surroundings, whose technique is faulty, and whose skill is unequal to the surgical requirements of the case, by men who are unable to cope with complications should they arise; whose instruments, anesthetic position and method are conductive to only a partial removal of the tonsil tissue, together with more or less mutilation of the delicate throat and palatal muscles, would be a broad statement, but, if true, would account largely for the general dread of the tonsil operations, and also for the continued ill health in certain cases, owing to the retention of diseased tissue.

That there are certain dangers in tonsillectomy cannot be denied. It is always a major operation, preparation for it should be in keeping with those

of major surgical operations. It is always a hospital operation.

It is the firm conviction of the writer that the common dangers can be avoided. Among these dangers are the anesthetic, asphyxiation from inspired blood and secretion, hemorrhage and shock.

The anesthetic of choice is nitrous oxid-oxygen. It is not profoundly toxic, such as chloroform or ether. Anesthesia is quickly induced. Its administration may be continuous, permitting an uninterrupted surgical procedure. There is absence of mucus secretions. Pure oxygen quickly awakens the patient, simultaneously checking any bleeding. There is no nausea following, and it is altogether not an unpleasant experience for the patient.

Inspiration of blood and secretion into the lungs is an immediate danger to the patient by asphyxiation, and a remote cause of pulmonary sepsis, pneumonia and death. Various positions, such as hanging the head downwards, placing the patient on the side, and various aspirators and suction pumps have been devised, in attempts to exclude these secretions from the larynx, trachea and lungs, for bear in mind that only in nasal or oral surgery, including exodontia, does blood per se become a danger factor. A patient can drown from a much smaller quantity of blood inspired. To avoid this danger in nasal and oral surgery, I have in my technique called to my assistance a great natural force—the force of gravity. I place the patient in such position as to allow all secretions to flow outward and downward out of the mouth or nose—the forward suspended sitting posture. A special chair is used, capable of attaining this position with all ages and sizes of patients. The operator's stool is quite low, so that the illumination from his head lamp is directed well upward. The patient's body leans well forward, about the angle 60 degrees, and chin still further declined so that the oral axis is 45 degrees or less. This obviates the necessity in sinus work of the post nasal plug, and in tonsillectomy of any swabbing or suction apparatus, and absolutely prevents blood inspiration when nitrous oxid-oxygen is administered.

Hemorrhage is reduced to a negligible factor by the dull dissection and finger enucleation, no sharp instruments being employed. The tonsil is simply peeled out of its capsule. It has been demonstrated that the tonsillar vessels very rarely bleed, but that profuse hemorrhages usually come from the severance of vessels in the surrounding muscles by sharp dissection or cutting through tonsil tissue. Postoperative hemorrhage is often induced by wretching and straining from ether or chloroform nausea and vomiting, which we avoid.

The danger of shock in any surgical operation is proportionate to the character and duration of the operation, and to the loss of blood.

This technique shortens the operative period to three minutes or less for the removal of both tonsils and adenoids; and sinus work is proportionately shortened and may be done thoroughly. This is due to the perfect view which the operator has in this position; his field clear of blood, without waiting for sponging, no time lost between anesthetic periods, as it is continuous, and both tonsils are removed at the same time by two sets of instruments.

The anesthetic is administered with equal facility in both nasal and oral operations, the process only being reversed. In some cases a partial nasal obstruction renders the oral administration easier than nasal.

In nasal and sinus surgery a special mouth inhaler is used, the gases being expired through the mouth; and in oral work both a small nasal inhaler and a mouth hook are simultaneously employed whereby the gases can be forced with sufficient rapidity to induce anesthesia, preventing the inhalation of air through the open mouth.

425 OHIO BLDG.

EXTRAORAL CONDUCTIVE ANESTHESIA FOR ORAL SURGICAL OPERATIONS.*

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BOSTON, MASS.

The possibility to fully control the pain in operations about the mouth and jaws by conductive anesthesia may be called the greatest progress in oral surgery that has been achieved in the last decade. Local anesthesia does not only free the region of the operation from the presence of the anesthetist and his appliances, but also eliminates the dangers attending general anesthesia, namely, the swallowing and aspiration of blood and pus. The absence of vomiting after the operation is another advantage eliminating the disintegration of the wound by the vomitus. The partial co-operation of the patient during the operation, the hemostatic action of the injections which makes the operation less bloody, and the absence of certain instruments used to administer the anesthetic or to open the mouth, make possible aseptic methods and better technic.

*Read during the Joint-Session of the Interstate Association of Anesthetists and the National Dental Association, at Louisville, Ky., July 26-27, 1916.

I. Teeth, Alveolar Process and Gums of Upper Jaw.

Incisor region	teeth and labial part	ant. sup. alveolar	infraorbital	Sedond Division of V.
	palatal part	naso palatine		
Bicuspid and molar region	teeth and buccal part	middle and post. sup. alveolar	spheno-palat. G infraorbital	
	palatal part	ant. palatine	spheno-palat. G	

II. Teeth, Alveolar Process and Gums of Lower Jaw.

Ant. region of 1st Bicuspid	teeth	inf. alveolar	inf. alveolar	Third Division of V.
	labial part	mental	.....	
	lingual part	lingual	.....	
Post. region from 2d bicuspid to 3d molar	teeth	inf. alveolar	.....	
	buccal part	buccinator	.....	
	lingual part	lingual	.....	

III. Inervation of Upper Jaw, Maxillary Sinus, and Lower Jaw.

Upper Jaw	.....	entire	.....	2d Division of V.
Max. Sinus	external part	sup. alveolar branches	infraorbital	2d Division of V.
	internal part	nasal branches	spheno-palat. G.	
Lower Jaw	.....	entire sensory branches	.....	3d Division of V.

IV. Inervation of Palate, Cheeks, Tongue, Floor of Mouth, Lips.

Hard Palate	ant. part	naso. Palatine		2d Division of V.
	post. part	ant. palatine		
Soft Palate	soft palate	mid. & post. Palat.	sphenopalat. G.	
	uvula	mid. & post. Palat.		
Cheeks	mucous membrane	buccinator	.....	3d Division of V.
Tongue	ant. part	lingual	.....	3d Division of V.
	post. part	lingual branch	.....	Glosso-pharyngeal
Floor of Mouth	.....	lingual	.....	3d Division of V.
Lips	upper lip	labialis superior	infraorbital	2d Division of V.
	lower lip	mental	inf. alveolar	3d Division of V.

V. Inervation of the Skin of Face and Neck.

Skin of outer cantus	Lachrimal		
Upper Lid, Forehead and Crown	Supra-orbital	Frontal	Ist Div. of V.
Skin of Inner cantus	Supra-trochlear	Frontal	
Tip of nose	Infratroclear	Naso-ciliary	
	Ext. nasal		
Ant. Part of Temple	Zygomatico-temp.		
Malar Region	Zygomatico-facial	Zygomatic	2d Div. of V.
Lower Eyelid and ant. part of cheek	Palpepral		
Ala of nose	Nasal	Infraorbital	
Upper Lip	Labial		
Angle of Mouth	Buccinator		3d Div. of V.
Ant. part of Auricle, Temple and Cheek	Auricolo-temporal		
Lower Jaw and Chin	Mental	Inf. alveolar	
Angle of Jaw	Ant. branch of great Auricular		Cervical Plexus
Post. Auricular region	Post. branch of great Auricular		
Inf. border of Jaw	Sup. cutaneous Coli		
Ant. part of neck	Inf. cutaneous Coli		

Notwithstanding these great advantages, we must, however, select our cases. Children, as a rule, are poor subjects for large surgical operations under local anesthesia; also sometimes very intelligent older children form exceptions, but even then it depends a great deal on the extent of the operation. Amongst the adults there are, of course, those who will only consent to an operation when performed under general anesthesia, while many patients for whom general anesthesia is contraindicated and dangerous can well be taken care of with the local methods. The excitable, nervous and timid patient who dreads knowing what is going on, or is afraid of the instrumentation, can almost always be taken care of easily by proper pre-anesthetic medication.

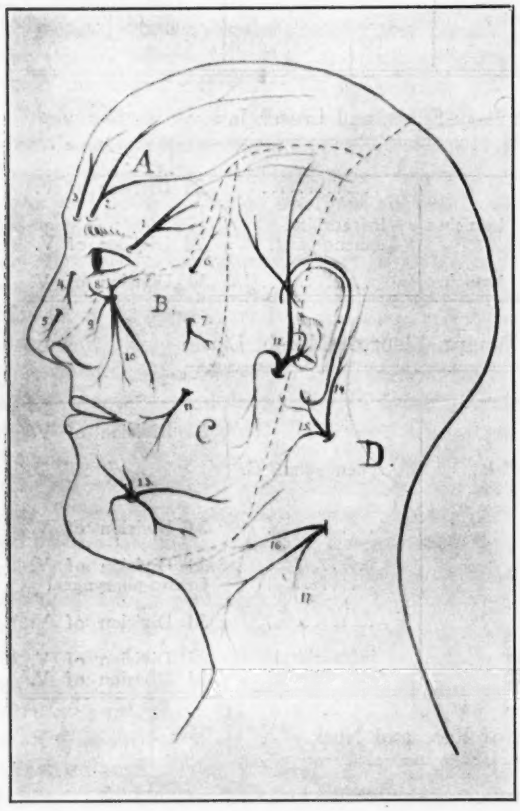


Figure 1. Lateral view of face showing nerve supply of the skin. 1. Lachrymal N. 2. Supraorbital N. 3. Supratrochlear N. 4. Infraorbital N. 5. Ext. nasal N. 6. Zygomatic-temporal N. 7. Zygomatic facial N. 8, 9, 10. Palpebral, nasal and labial branches of the infraorbital N. 11. Buccinator N. 12. Auriculo-temporal N. 13. Mental N. 14, 15. Posterior and anterior great auricular N. 16, 17. Superior and inferior cutaneous Coli N. *A* supplied by 1st division of V; *B* supplied by 2nd division of V; *C* supplied by 3d division of V; *D* supplied by cervical nerves.

The larger number of dental and oral surgical operations can be performed under anesthesia produced by the *Intraoral* methods. The *Extraoral* methods are indicated: (1) For all extensive cases where a large area is to be anesthetized and when the common nerve trunk supplying this area is not accessible from the mouth. This is especially the case for operation about the upper jaw. (2) For cases where deep penetration of the tissue is necessary to reach the nerve trunk, we should prefer the extraoral methods to the intraoral ones, as they permit perfectly aseptic technic and therefore eliminate the danger of infection.

SENSORY INERVATION OF THE ORAL REGIONS.

The success of local anesthesia depends a great deal upon the exact knowledge of the sensory inervation and nerve anestomosis of the parts to be operated on. A clear picture of the nerves and anatomical relations of the surrounding parts should be constantly before the anesthetist's mind.

Figure 2. Instrumentarium. Porcelain cup for dissolving and sterilizing novocain. Luer syringes of 5 cc. capacity. Assortment of needles. *E, F.* and *T.* tablets of novocain-suprarenin synthetic.

PREANESTHETIC MEDICATION.

For ordinary dental or small oral surgical operations, no special preparation is required. Extremely nervous patients and children may receive bro-

mural-knoll (alphabrom isovalerylurea), which is an excellent sedative.

If *extraoral* injections are used, preanesthetic medication is always indicated. For small things bromural is sufficient, but for deep injections followed by a severe operation, I give veronal gr. X before retiring and morphia gr. 1-3 thirty minutes before the operation. This stupifies the patient sufficiently so as not to mind the insertion of the needle. It also takes away the terror of the operating room and instrumentation, which are otherwise more or less feared by the patient.

Instruments and Drugs.

For the extraoral methods, I use a Luer or Rec-

Figure 3. Shows the needle about to be inserted into the infraorbital foramen. Ordinarily a short and very firm needle is used for this injection.

ord syringe, containing 5 cc. and steel needles of various lengths (Figure 2).

For the anesthetic, I used a 2 per cent. Novocain solution with 0.000,02 gram. Suprarenin synthetic to one c. c. This is prepared in the Novocain cup immediately before use, by dissolving the T or a combination of E and F tablets in Ringer solution. For local injections, which are sometimes used in addition to the conductive method in order to control anastomosis or bleeding, I use a solution containing more suprarenin, viz., 0.000,05 to one cc., prepared by dissolving one E tablet in one cc.

Technique of Administration.

Extraoral injections must be made under strict aseptic conditions. He who is not familiar with surgical aseptic methods should not undertake to use extraoral anesthesia.

The skin of the patient's jaw is prepared for the injection by application of tincture of iodine over a large area. The washing and shaving of the skin should be undertaken a reasonable time before the operation.

If preanesthetic medication is used, no special application is needed to reduce the pain from the needle. A small amount of the solution is injected under the skin. After the needle is fully inserted, suction should be applied before injection. If blood is drawn into the syringe, it is a sign that the point

Figure 4. Radiograph showing the needle inserted into the infraorbital foramen.

of the needle entered a vessel. It should then be withdrawn a short distance.

Maxillary Anesthesia.

Infraorbital Method.

Landmarks. The infraorbital foramen can be palpitated easily under the inferior border of the orbit (Figures 3 and 4).

Injection. A very fine needle is inserted directly into the infraorbital foramen from the surface of the skin a distance of about 1½ cm. It is important to make sure that the needle is not inserted into a vessel, which would be indicated by discharges of blood. One and one-half cc. is injected, with low and even pressure.

Waiting Period. The anesthesia usually occurs in a very short time.

Area Anesthetized. Same as in the intraoral method, namely, the upper incisor teeth, labial part of gum and the area supplied by the palpepral, nasal and labial branch of the infraorbital nerve.

Duration of Anesthesia. In this method we do not depend upon infiltration of the anesthetic solution through the infraorbital foramen, as in the intraoral method, and therefore get a quicker and more lasting result.

ZYGOMATIC AND MAXILLARY METHOD.

The intraoral methods of conductive anesthesia of the upper jaw have never been as satisfactory as those of the lower jaw, because there is no place where the blocking of the whole maxillary

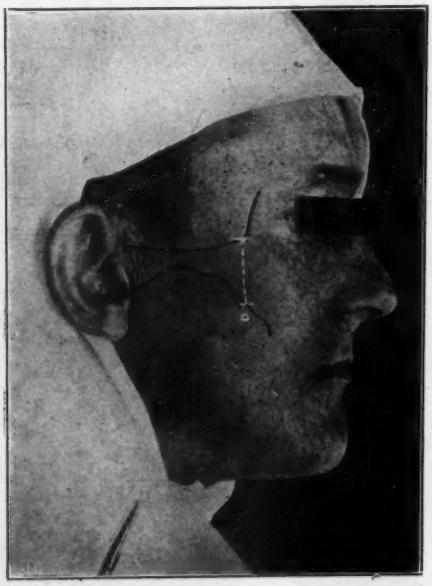


Figure 5. Method of finding injection point for the zygomatic and maxillary injection. Find the zygomatic angle and draw a line from this point vertically downward. ½ cm. below the place where this meets the inferior border of the zygomatic process is the point for the insertion of the needle.

division can be undertaken successfully from the inside of the mouth, and because the point of inserting the needle is not remote enough from the field of operation to come outside the disease zone in extensive lesions. Nevertheless, we can well take care of the teeth and their immediate surroundings with the intraoral conductive and the infiltration methods. But for large surgical operations in the oral cavity, and especially in war surgery, the maxillary injection is a great advantage.

Landmarks. Palpitate the superior border of the zygomatic arch and find the place where it forms a right angle with the superior margin of the orbit. This is called the *zygomatic angle.* From this point draw a vertical line downwards, and the point for insertion of the needle is about ½ cm. below the place where this meets the inferior border of the zygomatic arch (Figure 5).

Zygomatic Injection. With the teeth in occlusion, insert the needle with syringe mounted. A few drops are injected under the skin. Advance in a vertical direction to the cheek for 2 to 3 cm. Here we strike the maxillary tuberosity. If only the posterior molars are to be anesthetized, the injection can be made here and we have the extraoral method of the zygomatic injection.

Maxillary Injection. If the whole upper jaw is to be anesthetized, we continue in the same direction (Figures 6 and 7). Sometimes it is necessary to direct the needle a little further backwards to pass by the tuberosity which is felt for orientation, and enter the spheno-maxillary fissure. After further advance of 2 cm., we again find bony resistance when the point of the needle strikes the inferior part of the anterior surface of the larger wing of the sphenoid bone, just below the foramen rotundum. The depth at this place is about 5 cm. One

Figure 6. Shows a skull with the needle in position for anesthetizing the second division of the V nerve below the foramen rotundum.

to 2 cc. is injected. The injection is purposely made below the foramen to keep away from the nerves supplying the eye.

Symptoms of Anesthesia. After about five minutes the patient feels numbness in the nose, sometimes also in the upper lip, but the symptoms are much less marked than in the lower jaw.

Waiting Period. Complete anesthesia usually occurs in from ten to fifteen minutes.

Area Anesthetized. Practically all the parts supplied by the maxillary division are anesthetized, the maxillary bone, the teeth, the gum, half of the palate and upper lip, the anterior part of the cheek, the skin of the nose, the antrum and part of the nasal cavity.

Anastomosing and Communicating Nerves. Branches from the other side have to be considered and the facial branches of other divisions of the fifth.

Duration of the Anesthesia. The anesthesia lasts from 2 to 3 hours.

Undesirable Symptoms. Anemia in the region of the infraorbital artery sometimes causes circumscribed whiteness on the part of the cheek which is supplied by it.

Diffusion of the solution into the orbit is liable to occur, causing occular disturbances of short duration. The occulomotor or abducens nerve may be infiltrated, causing double sight, weakness in the upper eyelid, dilation of the pupil and, if some of the accompanying vessels are affected, anemia of the eyelids will be observed. Sometimes anesthesia of the soft palate gives difficulty in swallowing.

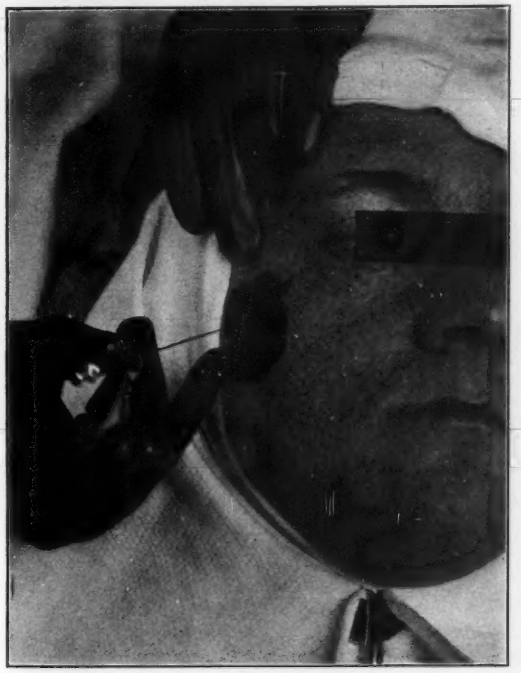


Figure 7. Shows the needle about to be inserted for the extraoral maxillary injection.

All these complications, which occasionally accompany the anesthesia, last from fifteen minutes to two hours, and are of no serious consequence, merely inconveniencing the patient for a short time. The patient should be told that these conditions occur at times and that they are of a harmless nature, so that he will not be frightened and lose his confidence. As this method is only used for operations of a serious and extensive nature, we can consider the occasional occurrences of the complications a small factor compared with the advantage of positive asepsis and the disadvantages of general anesthesia for such operations in the mouth.

Mandibular Anesthesia.

Extraoral Pterygo-Mandibular Method.

This injection is made into the same place as the intraoral one, namely, the pterygo-mandibular space. It is indicated whenever the intraoral method cannot be used, as is often the case in fractures of the mandible and trismus of the muscles of mastication.

Landmarks. A line is drawn from the tragus of the ear to a point marked by the anterior margin of the masseter muscle and the lower border of the mandible (Figure 8). The point where the mandible is divided into two halves marks the projection of the mandibular foramen upon the skin. The place to insert the needle is at the inner side of the lower border of the mandible, 2 cm. anterior to the angle of the ramus (Figure 9).

Position of left hand for the injection on the right side: Place index finger behind and parallel

Figure 8. Landmarks for finding the projection of the mandibular foramen upon the skin. Draw a line from the tragus of the ear to a point where the anterior border of the masseter muscle meets the infeior border of the mandible. Divide in halves. The point of division marks the location of the foramen.

with the posterior border of the ramus, the thumb in the same direction, its tip touching the lower border of the ramus.

Position of the right hand for injection on the left side: The left arm is passed around the patient's head, the thumb is placed behind the posterior border of the ramus and the index finger bent around the angle of the ramus. The head is bent towards the opposite side. The dismounted needle is now inserted at the point described.

Advance in a parallel direction to the posterior

border of the ramus, marked on the left side by the thumb and on the right side by the index finger. After the needle has been inserted about 4 cm., we are in the pterygo-mandibular space, and as the direction of the needle is parallel with the nerve it does not matter if the needle is inserted a little too far. Inject 2 cc. (Figure 10).

Symptoms of Anesthesia. Numbness of the lip is felt about five minutes after the injection.

Waiting Period. Anesthesia takes effect in fifteen minutes.

Area Anesthetized. The lower teeth and jaw on the side injected, the lower lip and anterior part of gum.

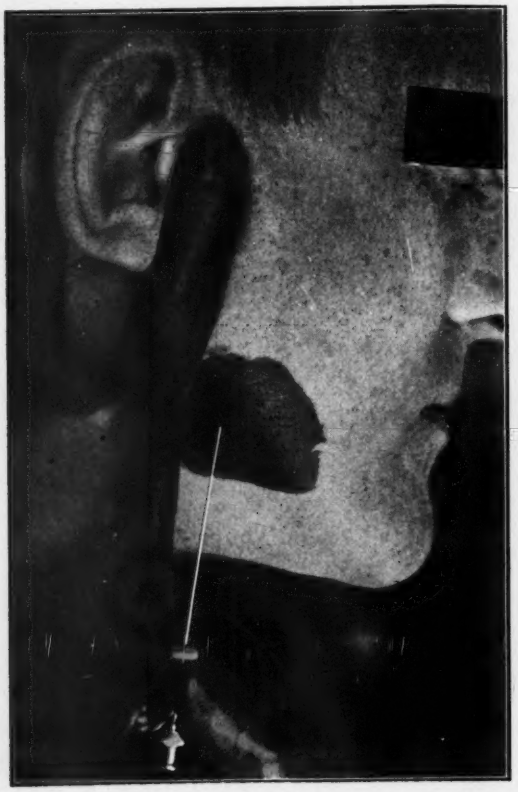


Figure 9. Shows the needle about to be inserted for the extraoral pterygomandibular injection.

Anastomosing and Communicating Nerves. The inferior alveolar nerve on the other side anastomosing in the incisor region and the lip. The lingual nerve supplying the inner part of the gum. If anesthesia of this nerve is required, it has to be taken care of separately. This can be done in two ways—either by withdrawing the needle about 1 cm. and reinserting it in the vertical direction which brings it further forward, or by inserting the needle 5 cm., which brings it higher up, near the place where the inferior alveolar and lingual nerve divide.

Duration of Anesthesia. Same as for the intraoral method, namely, about one hour if 2 cc. is injected.

Failures. The advance of the needle may find bony resistance in the depth of 3 cm. This comes from false direction of the needle point, striking a well-marked internal oblique line. The needle may strike bone at once, which may indicate a well-marked protuberance for the attachment of the pterygoid muscle. These mistakes are remedied by changing the direction of the needle.

MANDIBULAR INJECTION.

Anesthesia of the mandible can be accomplished very successfully by the intra and extraoral method of injecting into the pterygo-mandibular space. For the operations on the ramus, especially the superior part, and if the pterygo-mandibular injection

Figure 10. Shows a radiograph with the needle inserted for the pterygomandibular injection.

is contraindicated on account of pathological conditions, we may resort to the mandibular method.

Landmarks. A line is drawn from the zygomatic angle to the tragus of the ear. Divide into halves just below this point, and the inferior border of the zygomatic arch is the place to insert the needle (Figure 11).

Injection. Insert the needle and advance in a slightly upward direction. The needle passes anterior to the neck of the condyle and below the zygomatic arch (Figures 12 and 13). A few drops

Figure 11. Shows landmarks for the mandibular injection.

Figure 12. Shows a skull with the needle inserted to anesthetize the third division of the V Nerve.

may be injected at once. After advancing to a depth of 3-4 cm., the point of the needle should strike the smooth infratemporal surface. Now feel your way along for one more cm. until you strike the mandibular nerve, when the patient notices suddenly a radiating pain in the region supplied by it. Inject from 2 to 5 cc.

Symptoms of Anesthesia. The same as in the pterygo-mandibular injection.

Waiting Period. Ten to twenty minutes, depending on how close we get to the nerve and on the amount of solution used.

Area Anesthetized. Teeth and bone of the mandible, lower lip, chin, corner of the mouth, lower part of the cheek and temporal region.

Anastomosing and Communicating Branches. The anastomoses from the other side and, in some operations, branches of the cervical plexus.

Figure 13. Shows the needle about to be inserted for the extraoral mandibular injection.

Conclusions.

Extraoral methods of anesthesia for the mouth are not original with me. Such methods have long before been described by Braun and his followers, but have never become very popular.

I hope, however, that these simplified methods presented and the fact pointed out that such methods are less dangerous than similar ones, undertaken from within the oral cavity, on account of perfect asepsis, will be found not only a great help to the oral surgeon, but a benefit to the public in general.

43 Bay State Road.

ORAL HYGIENE IN RELATION TO ANESTHESIA, ANALGESIA AND THE ANESTHETIST.*

Bion R. East, D.D.S.,
Detroit, Mich.

Oral hygiene may be defined as the science of keeping the mouth healthy. In this paper the writer proposes to define oral hygiene as any agent which may be used to prevent that condition which may arise either locally or systemically, which is the result of improper care of the mouth and teeth, either by the patient himself or herself, or

*Read during the Joint-Session of the Interstate Association of Anesthetists and the National Dental Association at Louisville, Ky., July 26-27, 1916. From the Dental Department, Detroit Board of Health, in conjunction with the Research Laboratories of Parke, Davis & Company.

due to improper, unskillful or criminally careless dental operations.

At the outset the author wishes to impress upon the members of this association that he claims no originality in any statement he may make in this paper other than that of the report of the cases presented. He simply wishes to impress upon the members of this association the importance of mouth hygiene and to show a few cases which have resulted from lack of hygienic conditions in the oral cavity. The author is going to assume that any condition which has, or may develop into, detrimental effects upon the whole body economy would lower the desirability of anesthetizing an individual. Any condition which lowers the body resistance in general certainly has a harmful effect upon a patient's toleration of an anesthetic or analgesic.

A search of medical and dental literature discloses an absolute lack of thought along the subject of this paper, therefore the author wishes this essay to serve simply as an introduction to what surely will prove to be an interesting field of investigation.

I wish first to call your attention to a series of tests which were made to reconfirm the fact that in a mouth receiving very little hygienic attention, one in which caries of the teeth are prevalent or other

FIGURE 1.

Case No.	Condition of mouth.	Material taken from.	Bacterial findings.	Number per mg.	Virulence.
1	Good	Gingival margins	Staph. Pneumo. Spirilums	7,000,000 5,000,000 1,000,000	Low
2	Good	Gingival margins	Staph. Pneumo. Unident.	7,000,000 6,500,000 5,000,000	Low
3	Good	Gingival margins	Staph. Strep. Pneumo. Unident.	9,000,000 2,000,000 7,500,000 5,000,000	Low
4	Brushed daily Cavities Canals uptrid.	Gingival margins	Staph. Pneumo. Strep. Unident.	10,000,000 25,000,000 5,000,000 10,000,000	Fairly high
5.	Good. Blind abcess at apex of Bicuspid.	Gingival margins	Staph. Strep. Unident. Pneumo.	15,000,000 6,000,000 2,000,000 5,000,000	Low
6	Very bad Mouth never cleaned	Gingival margins	Staph. Strep. Pneumo. Unident.	20,000,000 7,000,000 15,000,000 100,000,000	Fairly high
7	Bad. Putrescent canals Never cleaned	Gingival margins	Staph. Strep. Pneumo. Unident.	15,000,000 3,000,000 30,000,000 50,000,000	High
8	Fair teeth Cleaned with handkerchief	Gingival margins	Pneumo. Staph. Strep. Unident.	6,000,000 10,000,000 8,000,000 110,000,000	Fairly low
9	Fairly clean Cavities	Gingival margins	Pneumo. Strep. Staph. Unident.	17,000,000 5,000,000 40,000,000 100,000,000	High
10	Very bad mouth Mass of decayed teeth	Gingival margins	Pneumo. Staph. Strep. Unident.	45,000,000 70,000,000 2,000,000 11,000,000	High
11	Never cleaned Fairly good	Gingival margins	Pneumo. Staph. Strep. Unident.	25,000,000 100,000,000 6,000,000 2,000,000	Very high

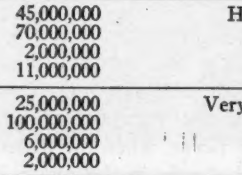


Figure 2.

Figures 3, 4 and 5.

pathological conditions present, that bacteria were more prevalent and of greater virulency (Figure 1).

An examination of these charts show the bacteria much more virulent where no care is given the mouth. The great number of pneumococci present is of the greatest interest to the anesthetists.

In case No. 10, 45,000,000 pneumococci to the milligram were found present, of very high virulence; if for any reason this patient should be given a general anesthetic he surely would be a very favorable subject to develop postoperative pneumonia, if the patient should inhale saliva containing such virulent bacteria in such numbers as is present in his oral cavity. The combination effect of shock, which certainly follows the combination of general anesthesia, and the major operation, which made it necessary to give a general anesthetic, lowers the resistance of the body. Understand that I do not say the shock which follows a general anesthetic alone. Crile has demonstrated that the resistance is increased where nitrous oxide and oxygen is used as an anesthetic and the operation performed carefully in combination with local anesthesia, but many operations are not done carefully, many are of such a nature and magnitude that the patient must suffer shock and the body resistance lowered. I think you will agree that if the patient inhaled a saliva such as subject No. 10 is the possessor of, he might develop pneumonia, and the anesthetists or the agent

Figure 6.

Figures 7, 8 and 9.

used to anesthetize the patient receive full blame. It would be strange if it did not occur.

I am sure that if a careful examination of the mouths of patients who have contracted post-operative pneumonia were made, a high percentage of them would be found to have unhygienic conditions present, due to caries, or pyohorrhea, and that proper attention to overcome these conditions before the anesthetic was given would have eliminated the dreaded pneumonia.

Members of this association who have the opportunity to follow such cases in hospitals would find an interesting field of observation and confirm what many think to be true.

It has only been within the past year or so that the average physician could see anything in the mouth other than a tongue, when he made an oral examination. He considered the mouth simply as a convenient aperture through which he could examine the pharynx.

The teeth and gums seemed to have been considered as something entirely distinct from the whole body economy. The physicians and dentists must have labored under the impression that the teeth were created for the sole purpose of providing a suitable object upon which the dentist could exhibit, at times, his none-too-skilful workmanship.

Pyorrhoea alveolaris was dismissed as an inconvenient but harmless disease, which was only cured by wholesale extraction. Pulps were destroyed and removed from teeth, and root canals allowed to go unfilled. Abscessed teeth were treated and supposed to be cured, but almost universal use of the dental radiograph has proven that many teeth, though comfortable, have rarified areas at their apices.

Billings, Hartsell, Harris and others have proven that the infection here is the original cause of many systemic conditions, and when this focus was removed the systemic condition was relieved.

Conditions such as these must react upon the patient when anesthetized.

I am glad to state that conditions are rapidly changing; root canal filling and treatment is being

Figures 10, 11 and 12.

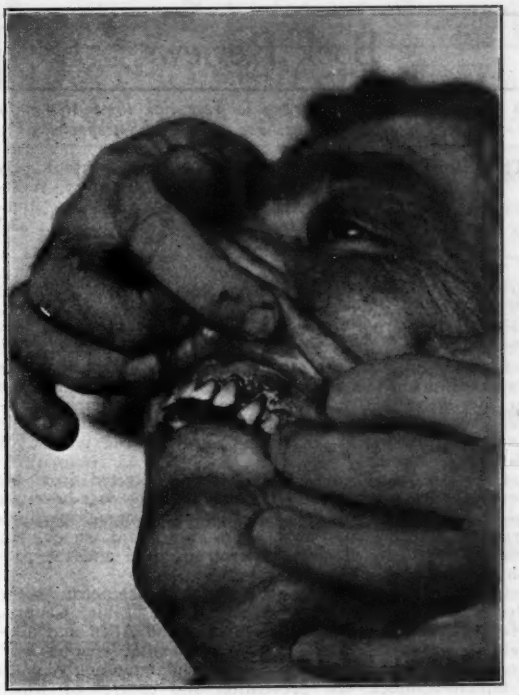


Figure 13.

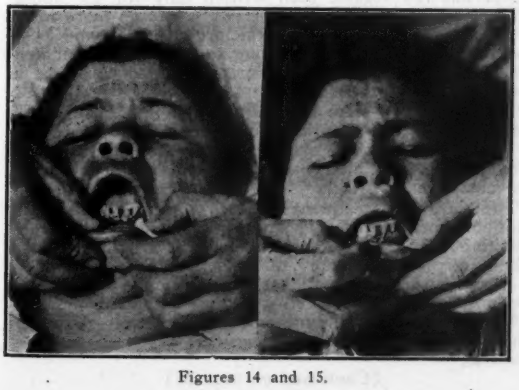
undertaken seriously. Pyorrhoea alveolaris is being treated and cured by skilful manipulation in conjunction with proper medical agents, of which Emetin does not seem to be one.

Unsanitary bridge work is being removed and is being replaced by removable, hygienic substitutes.

I wish to exhibit a few cases showing the result of mouth infection and their primary cause.

Figure 2. The pulp has been destroyed in this lower molar, but the root canals are unfilled. Infection has destroyed the peridental membrane and alveolar process. The patient suffered no little pain and the permanent loss of the tooth. This is the result of improper root canal treatment on the part of the dentist.

Figure 3. Shows a case of pyorrhoea referred to the board of health dental clinic by one of Detroit's hospital polyclinics, suffering with arthritis. Male, age 60, unable to dress or feed himself, unable to work.



Figures 14 and 15.

Figure 4. Shows the degree he could close his hand at the beginning of treatment, which consisted of a thorough scaly of the teeth, the administration of a proper dosage of vaccine, and attention given to the elimination of waste products in the intestines. After four weeks he could close his hand as in Figure 5. The patient then resumed his work and was quite normal in every way.

Figure 16.

Figure 6. A case from the dental department, Detroit Board of Health. Diagnosis, pyorrhoea; infection, primary strep. pyognes.; very virulent, but no rheumatism. Digestion very bad.

TREATMENT: Very thorough local treatment combined with emetine hypodermically and in tablet form. Before the emetine injections into the pockets, the recession shown was not present, but appeared twenty-four hours after the injection. Was it caused by emetine? Radiographs showed laterals gone, and they were extracted. The emetine treatment was now discontinued. After the emetine was entirely eliminated from the system, the teeth were then scaled and vaccines used. His digestive apparatus returned to normal; pus ceased, and he is now on the road to recovery.

Figure 7. Ulcer on the breast which defied treatment for two years. This ulcer disappeared two weeks after the mouth infections were elimi-

nated. Elimination consisted of simply extracting all diseased teeth, and the curetment of their sockets. Figure 8, shows the abscess healed. Figure 9, shows the condition of the mouth before treatment. Figure 10, baby at the time the mouth infections were broken up. Figure 11, one week later. Figure 12, six weeks later.

Figure 13. Rheumatic, unable to turn head; diagnosis, pyorrhoea. Referred by Harper Hospital. Temperature, 101. *Treatment*: Scaling carefully and slowly done to avoid allowing the absorption of too much toxin at once. Vaccine given every five days. *Results*: Normal temperature in one week. Last traces of rheumatism gone in twenty-eight days, and no return in seven months.

Figure 14. Rheumatic, gums very painful, under treatment one month. Figure 15, taken four days after Figure 14. Joints badly swollen. The teeth very painful and resisted the usual treatment given in such cases, including vaccines. A filtered virus was then made from the pus, and an animal immunized against the virus. The complement was then obtained, diluted 1 to 1,000, and combined with normal serum. This was placed in all the pus pockets. At the same time large doses of vaccine were used. A response came in one week. Two weeks, and all soreness left. Case still under treatment.

Figure 16. Tubercular patient; tubercle bacilli found in the pockets in large numbers. Local treatment only, with complement injected in the pus sockets was used. Cessation of the flow of pus, resulting from the treatment.

What is to be learned from these cases? First: That unhygienic conditions in the mouth have a very marked systemic effect. Second: That this may affect parts quite remote from the accepted locations. Third: We can infer that any conditions as potent as some mouth infections will be detrimental to anesthesia. Fourth: That patients with systemic infections should be given the benefits of oral hygiene and vaccines before and after operations under anesthesia and analgesia.

But what relation can oral hygiene bear to the anesthetist? First: Any agent which reacts upon the patient harmfully must indirectly affect the anesthetist and his work. Second: Anesthetists, being no more immune to pathological conditions in the mouth than any other human, may at the present time, and probably are, absorbing toxins and lowering their body resistance.

Let everyone who suspects improperly filled root canals, or ill-fitting bridge work in his or her mouth, have radiographs made; and if pathological conditions are found, have them removed before it is necessary to become the victim of a brother anesthetist.

DAVID-WHITNEY BUILDING.

Book Reviews

A carefully selected library is essential to a thorough knowledge of the science and practice of a specialty.

The Kinetic Drive: Its Phenomena and Control. By GEORGE W. CRILE, M.D., Professor of Surgery, Western Reserve University. Octavo of 71 pages, illustrated. W. B. SAUNDERS COMPANY, Philadelphia and London, 1916. Cloth, $2.00 net.

This brief volume is the Wesley M. Carpenter Lecture, delivered before the New York Academy of Medicine in 1915, and is in effect an epitome of a monograph in preparation, which will offer the complete experimental evidence upon which its themes and postulates are founded.

Most anesthetists are more or less familiar with Crile's exploitation of the *kinetic drive*, especially in its relation to thyroitoxicosis, cardiovascular disease, nephritis, diabetes and operative procedures on acute and chronic extrahazardous risks, in connection with the technic of *anoci-association*.

Crile has added some further data, collected from his personal experiences and researches in the war-hospitals of France; and the text is amplified with numerous illustrations showing the cytologic analysis of shock, the stabilizing effects of sleep and nitrous oxid and the prophylactic influence of alkalinization.

Crile is a clever phrase-maker and in the term *kinetic* drive he has welded the researches of Lillie, Cannon, Henderson, Clark, Osterhaut, Fischer and Allen and himself into a comprehensive conception that enables surgeons and anesthetists to speak understandingly of a symptom-complex, the prevention and control of which has become of vital importance in safe operating.

While some of his themes and postulates are being questioned by independent research-workers, undoubtedly much of what Crile has contributed to the understanding of the kinetic drive as a factor in human mechanism, and the diseases to which it is subject, will stand as a permanent addition to the sum total of scientific knowledge.

Surgical After-Treatment. By L. R. G. CRANDON, M.D., Assistant in Surgery, Harvard Medical School, and ALBERT EHRENFRIED, M.D., Assistant in Anatomy, Harvard Medical School. *Second Edition.* Octavo of 831 pages with 264 original illustrations. W. B. SAUNDERS COMPANY, Philadelphia and London, 1914. Cloth, $6.00 net.

The co-authors term their work a manual of the conduct of surgical convalescence, but it is much more than that. While it does, in an exhaustive manner, detail the technic of surgical after-treatment for almost every known operation, it goes farther and devotes almost as much attention to collateral matters of importance.

Initially it is a stirring appeal to abandon the traditions of empiricism in favor common sense dictates based on progressive, scientific investigations. What advice is given is such as has stood the test of extended practice and satisfactory service.

Nor has the volume been written only for the house-surgeon or general practitioner. It is of far more interest to the anesthetist, since the pre-operative and post-operative care of patients coming to operation under general anesthesia, is more and more coming to be placed in the hands of the anesthetist.

The co-authors seem to have realized this trend within the profession and they have, consequently, devoted much of their book to the elaboration of surgical care and convalescence as it affects and is affected by the anesthetist and anesthesia.

The thorough treatment of such topic as preliminary and post-operative diet, posture, anesthetic nauseau and vomiting, thirst, headache, shock, coma, artificial resuscitation, oxygen and many other details of vital interest to the anesthetist, show that the surgical complications are not always the more important untoward incidents in what are termed uneventful recoveries—recoveries which patients themselves consider anything but uneventful.

(*Continued on page 28*)

American Journal of Surgery

QUARTERLY SUPPLEMENT *of* ANESTHESIA *and* ANALGESIA

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F. HOEFFER McMECHAN, A.M., M.D., *Editor*

Avon Lake, Ohio, U.S.A.

JANUARY EDITORIALS. 1917

THE NURSE ANESTHETIST IN KENTUCKY, MICHIGAN AND OHIO.

The profession-at-large in a number of states is gradually awakening to the fact that the nurse-anesthetist abuse is an insidious treachery within the ranks of legitimate licensed practitioners, and radical measures are being adopted to stamp out the illegal and unethical administration of anesthetics.

During the Hopkinsville Meeting of the Kentucky State Medical Association, October 26, 1916, the following Report of the Committee on Ethics was presented to and *unanimously* adopted by the House of Delegates:

"The *esprit de corps* of the medical profession is due to the observance of medical ethics by the profession. Medical ethics stand for etiquette and fair dealing among physicians and the ethical physician does nothing to lower the high standard of the medical profession. . . . It is unprofessional for a physician to assist unqualified persons to evade legal restrictions governing the practice of medicine, and physicians should expose without fear or favor, before the proper medical or legal tribunals, corrupt or dishonest conduct of members of the profession.

"Your Committee, in this connection, desires to call your especial attention to a violation of these principles of ethics in the employment by surgeons of nurses and others as anesthetists who are not trained in the practice of medicine. It is urged that this is a procedure under the control of the surgeon, but we submit that neither law nor usage permits surgeons to decide who shall be permitted to practice medicine. In addition few surgeons are qualified better than others of the profession in the administration of anesthetics. In order, therefore, to stop this evil now, your Committee recommends that the medical profession of Kentucky request its members not to employ other than qualified physicians as anesthetists, except in cases of emergency. In order to make this request urgent and effective, we would suggest that the profession should not refer cases to hospitals where nurses are allowed to give anesthetics and that hereafter no member who violates the law and ethics shall be considered in good standing in this Association. . . ."

Undoubtedly this unanimous decision of the Kentucky State Medical Association will not only definitely abolish the nurse-anesthetist abuse in Kentucky, but will, of necessity, challenge the attention of the Judicial Council of the American Medical Association to the fact that even the most prominent members of the national organization may no longer dare to flaunt the employment of the nurse-anesthetist in the faces of their ethical confreres.

The State of Michigan has also aligned itself on the side of law and ethics in regard to the nurse-anesthetist. In the November issue of the Journal of the Michigan State Medical Society, Dr. F. C. Warnshuis, Sec'y-Editor and a Member of the Michigan State Medical Board, after quoting the Resolution of the Ohio State Medical Board against the nurse-anesthetist in Ohio, comments as follows on the propaganda of the Interstate Association of Anesthetists to restrict the administration of anesthesia to licensed physicians and dentists:

"This movement should and must receive the approval and support of the united profession. The administration of an anesthetic should never be entrusted to any but skilled individuals, trained to select the safest agent for each individual case. That a nurse, after three years of hospital training and a few months experience in the giving of anesthetics, is deemed a competent anesthetist is preposterous if not criminal. Such an individual is wholly incompetent to make a physical examination to detect renal, circulatory and respiratory defects. Neither can such a one estimate the variance from the normal that disease and surgical conditions have produced. Consequently there will be evidenced a marked inability to select the safest indicated anesthetic agent or to be alert to the precautions that must govern its administration.

"It is, from a legal standpoint, unlawful and a violation of the Michigan Medical Act for other than registered physicians to administer anesthetics. They who violate the law are amenable to its penalties."

It is interesting to note that the Ohio State Medical Board, following the open hearing on the nurse-anesthetist held in the Senate Chamber of the State House, Columbus, O., October 2, sustained its original Resolution withdrawing recognition of Lakeside Hospital, Cleveland, O., as an Acceptable Training School for Registered Nurses, pending the discontinuance of instruction to nurses in anesthesia and the administration of anesthesia by nurses in that institution.

Thus Georgia, Kentucky, Ohio and Michigan have split the country in twain on this problem of medical law and ethics and the decisions of their State Boards and Associations will be pivotal in the propaganda to restrict the administration of anesthetics to licensed physicians and dentists throughout the United States and Canada.—McM.

Book Reviews

(*Continued*)

In its wealth of material and almost exhaustive consideration of specific details, this volume offers the anesthetists all available information for making the operative ordeal safe and pleasant and convalescence as brief and comfortable as possible. The use of such knowledge is a wonderful advertisement to both the surgeon and the anesthetists, and the results of such treatment provocative of increased patronage.

Gould's Practitioner's Medical Dictionary. By GEORGE M. GOULD, A.M., M.D. *Third Edition.* Revised and edited by R. J. E. SCOTT, M.A., B.C.L., M.D. XX+962 pages, illustrated. P. BLAKISTON'S SON & CO., Philadelphia, 1916. Flexible cloth, $2.75.

This *new edition* provides a modern, up-to-date, scholarly and reliable dictionary for physicians and specialists, containing all the words and phrases generally used in medicine and the allied sciences, with their proper pronunciation, derivation and definition.

The principle feature of the revision is the inclusion of some 20,000 new words. While sufficiently comprehensive for all purposes, compactness has been secured by the employment of type just sufficiently large to be legible for casual and brief consultation, the use of thinner paper, a flexible binding and the omission of already familiar and hence unnecessary illustrations.

The definitions are based on the standard literature from authoritative sources and current terms, sanctioned by widespread usage, have been included irrespective of their philological correctness.

In its new format the anesthetist will find this well-known dictionary even more useful than before.

Applied Anatomy. By GWILYM G. DAVIS, M.D., M.R.C.S., L.L.D., Professor of Orthopedic Surgery, University of Pennsylvania Medical School. Octavo, X+630 pages, with 631 illustrations, many in color, by ERWIN F. FABER. *Fourth Edition.* J. B. LIPPINCOTT COMPANY, Philadelphia, 1916.

"In dealing with major operations, the successful application of local anesthesia demands patience, time and skill,—skill that can only be acquired and exercised on the human cadaver by those, who, being anatomists, can alone survey the field of operation with fluoroscopic eyes. For this reason the practice of peripheral anesthesia, especially in its neuroregional aspects, appeals most pointedly to the young, ambitious and well trained surgeon, who, fresh from the anatomic laboratory, finds here as nowhere else an immediate and practical application for a knowledge that he has acquired at the cost of long nights of vigil, labor and thought.

"In these days when exact topographic and applied anatomy are rated somewhat at a discount, it is a source of no small gratification for the young, but well-trained, man to discover that his anatomic knowledge is a living, palpable and productive asset. Not a thing to be learned solely as a matter of academic culture and soon to be forgotten, but a practical tool to be used in unlocking his most immediate technical problems. It is only through the aid of applied anatomy that regional anesthesia is what it is today. For this reason alone it deserves the encouragement and fostering care of every surgeon and every teacher who has at heart the higher welfare of its science and its art."—Rudolph Matas.

Davis' volume is a thorough, practical, comprehensive and illuminating exposition of the subject, equally valuable to the operating surgeon using local anesthesia or the teacher demonstrating its principles. While in the past applied anatomy has been almost exclusively associated with the diagnosis of surgical lesions and their proper repair, at the present time, an intimate knowledge of applied anatomy is a *sine qua non* for success in using local or conductive methods of anesthesia or analgesia in surgical operations.

The text-books on local anesthesia are rather inclined to neglect the wealth of applied anatomy that can be brought to bear upon any given surgical problem under anesthesia and analgesia and consequently the thorough student must refer back to authoritative works on the subject—among which Davis' may well be reckoned as among the best.

The book is beautifully printed and many of the pictures are done in colors, by the Fabers, who are rather exceptional anatomical artists.

Once used this work appeals to the progressive surgeon-student of regional anesthesia, as one of the most valuable supplementary volumes he could possess.

Essentials of Operative Dentistry. By W. CLYDE DAVIS, M.D., D.D.S., Dean and Professor of Operative Dentistry and Technic, Lincoln Dental College. *Second Revised Edition.* Small octavo, 334 pages and 180 illustrations. C. V. MOSBY COMPANY, St. Louis, 1916.

This volume will undoubtedly satisfy the general practitioner of dentistry by dealing in a practical manner with the essentials of operative dentistry. The author has discreetly eliminated doubtful procedures in favor of routinely successful methods and technics.

Cavity preparation, gold and porcelain inlay receive adequate attention from the author and all steps and details of operative technic are profusely illustrated in a most illuminating manner.

Similarly other phases of operative dentistry are fully dealt with, such as gold, amalgam and cement fillings.

Perhaps the most important essentials detailed are those pertaining to local and conductive anesthesia in relation to operative procedures, especially extractions. The chapters devoted to the consideration of anesthesia are illustrated in an especially valuable manner so as to indicate the relation of the technic to the applied anatomy and the contemplated operation.

Dentists are proverbially practical and Davis' book will be found more than practical enough to interest them. The fact that the work has achieved its *second edition* so soon is conclusive evidence that it is meeting a need and satisfying it.

Essentials of Laboratory Diagnosis. By FRANCIS ASHLEY FAUGHT, M.D., Director of the Laboratory of Clinical Medicine, Medico-Chirurgical College, Philadelphia. Octavo of 449 pages, 69 illustrations and flexible cover. *Sixth Edition Revised.* F. A. DAVIS COMPANY, Philadelphia, 1916. Cloth, $3.00.

The anesthetist is no longer an isolated specialist. He has become a vital factor in the surgical team and not the least important phase of his work is the preparatory investigation of the condition of patients coming to operation under anesthesia and analgesia. In this new capacity the conscientious anesthetist is in duty bound to be familiar with all the latest, approved and available methods of diagnosis, especially those essential to the laboratory.

The more competent the anesthetist is in fulfilling his obligation the more valuable will be his service to the surgeon and patient, and the more conspicuous his part in securing safety, comfort and satisfactory results.

In this connection the progressive anesthetist will find Faught's volume invaluable as a constant source of accurate and practical reference regarding the essentials of laboratory diagnosis. Now that cardiac, renal, respiratory and blood tests are concomitants of the preparatory regime, the anesthetist must be prepared to collaborate in using these safeguards in all instances wherein the least hazard to life is involved.

To those anesthetists who are interested in research in connection with their specialty this book of Faught's offers a compendium of every method of procedure calculated to give scientifically accurate data.

As a whole it is one of those handy volumes that can be constantly referred to without disappointment.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

THE LOUISVILLE SOCIETY OF ANESTHETISTS AND UNLICENSED ADMINISTRATORS.

The Louisville Society of Anesthetists, through its Secretary, Dr. E. F. Horine, in agitating the question of the administration of anesthetics by unlicensed persons, has secured a pertinent opinion from the Attorney General of Kentucky, in which he states:

". . . I am firmly of the opinion that no person should be permitted to administer an anesthetic unless such person possesses the qualifications and requirements provided in the laws of this State for the practice of medicine and surgery. It may be urged that the administration of an anesthetic by some person under the immediate direction of the physician would be unobjectionable, but even if this is true, which I cannot concede, the fact nevertheless remains that a person so administering an anesthetic is engaged in the practice of medicine, and unless the person so administering the anesthetic has complied with the laws of this State for the practice of medicine, he (or she) would be acting in violation of the law and subject to the penalties therein prescribed."

The agitation of the question of the non-medical and unlicensed anesthetist by the Louisville Society of Anesthetists, followed the introduction of an imported nurse-anesthetist into the clinic of one of Louisville's most prominent surgeons.

In view of the opinion of the Attorney General and the Kentucky State Medical Association's action (*see Editorial*), the decision of this surgeon in respect to the continued employment of a nurse-anesthetist will be awaited with interest.

THE INTERSTATE ASSOCIATION AND UNLICENSED ANESTHETISTS.

While Georgia, Kentucky, Ohio and Michigan have aligned themselves on the side of law and ethics in the movement of the Interstate Association to limit the administration of anesthetics to licensed physicians and dentists, the menace of the nurse-anesthetist is still paramount and if anything more vicious than ever.

It is consolling to realize that such states as Indiana and Tennessee will shortly abolish this abuse, but it is deplorable to have to report that certain prominent clinics, postgraduate schools, hospitals and surgeons are sending out nurse-anesthetist into the interstate practice of medicine. Appeals have recently been received by the Secretary of the Interstate requesting the activity of the association in abolishing the nurse-anesthetist abuse in Texas and Wisconsin.

Apparently this menace will not be entirely subdued until every state medical board and every state association has declared the abuse illegal and unethical, and the Interstate Association will not stop short of such an outcome.

As an indication of just what the Interstate Association has to contend with in Pennsylvania, the following letter from Dr. J. M. Baldy, President of the Bureau of Medical Education and Licensure, is printed. This letter was in reply to a request to have the Bureau pass on the legality of the unlicensed anesthetist, and as part of a movement to secure better fees under the workmen's compensation act.

BUREAU OF MEDICAL EDUCATION AND LICENSURE.
November 2, 1916.

My dear Dr. McMechan:

I have your letter of October 27, together with the enclosure, "A Review of Some Problems in Anesthesia."

In considering my answer I want you to take clearly in view my dual personality: first, as a State officer, and second, as a medical man. In connection with this matter I would call your attention to an address I made as President of the American Gynecological Society, in the year 1908. You will find that address in the Transactions of that Society. This address dealt very largely with the question of anesthesia. I had been, before that time, and have been since, most deeply interested in this whole subject. *The condition of the administration of anesthesia and the pitiable dependency on the patient upon utterly incompetent doctors, is depicted in that address. It holds absolutely good today, and so far as I can see, as a medical man, the future is as dark as the past; at any rate within the limits of our lifetime.*

If your Society could provide a sufficiency of competent anesthetists for this country, no one would hail the fact with greater glee than would I. But you, as a body, are not a grain of sand on the seashore in fulfilling that want. If I could see the possibility of the medical hospitals of the country being able to financially employ a medical man for full-time service (that is full-time as applied to their individual requirements), both for the giving of anesthesia and the teaching of the interne, I would be inclined to adopt your position.

Leaving the professional standpoint and turning to that of the State administrator I look over your communication in vain for a single word that demonstrates that your demands are made from a humanitarian standpoint. As an administrator it is my business to primarily keep before my eyes the benefit of the 7,000,000 people in this State. In looking over your communication, I see a plea, which is dominated from beginning to end, not with humanitarian purposes, but with financial purposes for a favored few—the doctors. *As an administrator the financial interests of the doctor doesn't enter in the slightest degree into my calculations. It is none of my affair in securing competent service for the citizens of this Commonwealth, whether the doctors get anything or not, any more than it is that I look for compensation for the lawyers of the community, or for the dressmakers or storekeepers or any other business clique. I see before me in inspecting and handling the hospital situation in Pennsylvania, the exact situation I pictured in my Presidential Address. I see in those 8 years absolutely no change for the better, whatever, so far as the doctors are concerned. I see the doctors doing what they have done in the past, using anesthesia for the purposes of their own pocketbooks, and with absolutely no other interest whatever in the giving of it. I see no inclination on their part for a change, taking them as a body.* You will understand that I am not including such men as belong to your Society, but you are such a pitiable minority, that you cannot help the citizens of this commonwealth out of the situation in which they are. Now as an administrator I have found a way, which on trial has demonstrated that we can help the citizens of this Commonwealth out of that to which they have unwittingly and unknowingly submitted, since ether was discovered. The woman-anesthetist, be she nurse or otherwise, is solving the difficulty in Pennsylvania, and we are today getting a safe administration, where before we had a most dangerous one.

Now, if this assertion is true, you must admit that from a humanitarian standpoint I would be criminally culpable, if on any sentimental ground I were to consent to any change in the present situation, without having at hand a competent substitute. Show me the substitute and I am perfectly willing to cooperate in throwing the work entirely into the hands of the profession. But until I do see the competent substitute, after what we have accomplished in Pennsylvania, I am afraid I will have to abide by our present arrangements.

You may not understand the situation in Pennsylvania. Allow me to present it to you, officially, in order that your Association may have no mistaken idea as to just what we require. Our advice to the hospital is as follows: name a member of your medical or surgical staff as head of the Department of Anesthesia. Give him one or more assistants, in the shape of a full-time individual, doctor or nurse, who has been especially trained in the giving of anesthesia. Make the physician head of your Department responsible for the proper administration of the drug.

This gives the doctor full opportunity and chance to take the whole matter in his own hands, if the hospital is able to stand the expense, and he has the ambition and

desire to fill the position himself. What it does is to give them the alternative that where the doctor is not available or will not make himself available, they are not left in the lurch and the people of this Commonwealth are not put at the mercy of the old system. You may say this is a half-way measure. I think myself it is and if by adopting such a measure, it works out in the long run, by evolution to the position your Association assumes, no one would be better pleased than I am.

I have tried to make my position in this matter perfectly clear, and I think you will find it exceedingly difficult to pick any serious flaw in the situation as it exists in Pennsylvania.

The matter remains open in the hands of the doctors themselves. First, to take enough interest in anesthesia to make themselves competent. Second, to bring pressure to bear on their Boards of Managers to pay a sufficient salary to compensate them for the time they give, and if with that opening they do not retain the business in their own hands, you can hardly expect that the State is going to retain the business for them.

Very sincerely yours, (Signed) J. M. BALDY.

Comment on this letter is withheld for the present, pending the action of those in higher authority in Pennsylvania. The Secretary of the Bureau's absolute refusal to present the medico-legal phase of the nurse-anesthetist to the Attorney General of Pennsylvania, is the first instance in which, in its propaganda, the Interstate has found a State Medical Board which deems itself a law unto itself.

About the time some court in Pennsylvania mulcts some employer of punitive damages on account of an anesthetic fatality in a workmen's compensation operation, when the anesthetic has been administered by a nurse, both the Bureau and the Compensation Board will have pause to think. They will at least not have the excuse of not having been warned.

This whole matter has been brought to the attention of the proper authorities in the Pennsylvania Medical Association for action. It remains to be seen whether the Association will protect the rights and privileges of its component members granted under the medical practice act.

SIX MONTHS' WORK IN ANESTHESIA.*

ALMA VEDIN, M.D.,

Anesthetist to the New York Hospital; Consulting Anesthetist to the New York Infirmary for Women and Children.

NEW YORK CITY.

The cases comprise general and gynecological surgery, as well as a small percentage of tonsils and adenoids. The routine method employed has been ether by the drop method, preceded by nitrous oxide in adults and ethyl chloride for young children. In head and neck cases, endotracheal or pharyngeal insufflation has been used, and in minor cases nitrous oxide and oxygen, or ethyl chloride. The ethyl chloride has been dropped or sprayed on the gauze covered mask, and in some cases its use has been continued as long as half an hour, always with good results. The patients have had a beautiful pink color and no mucus, and the action is very rapid, as well as the awakening. Chloroform has seldom been employed on account of the danger; a few drops have been added occasionally to deepen ether anesthesia.

Our patients as a rule suffer little from the anesthetic, many having no conscious vomiting nor nausea, and very seldom excitement or cough during induction. No preliminary medication is given. They are kept in recovery rooms adjoining the operating room until conscious.

The anesthetics are administered by the official anesthetist, the junior staff doctor, substitutes, and students, under supervision. It has been our aim to induce anesthesia as pleasantly and quickly as possible, and to keep the patient as lightly under as the operative procedure will allow, thereby reducing hemorrhage and shock; for there is no doubt that there is more oozing when the patient is completely relaxed and hence more tendency to shock.

In 656 cases where careful records have been kept there was no conscious vomiting in 334 cases, or 50.91 per cent., and 210, or 32.01 per cent., had slight vomiting, whereas 112, or 17.07 per cent. had considerable long continued or late vomiting. Seventy-seven suffered from headache and 269 from varying degrees of thirst. Forty-five complained of cough, but very few to the extent that treatment had to be instituted. Thirteen of these were coughing before the operation. These data have been obtained by closely questioning the patients, and they have seldom complained of the anesthetic.

It is generally thought that without a preliminary hypodermic injection of morphine and atropine, the patient will suffer much with mucus, but we have not found this to be the case. It is only in the exceptional cases that we have been troubled with excessive mucus, and these have not been among the cases that have later developed pneumonia. The pneumonias have been studied by Dr. Frederic Bancroft and described at length by him in discussing Doctor Whipple's paper on Postoperative Pneumonias.[1] His discussion is given below.

Ether seems to us the safest anesthetic, and its administration by the open drop method the safest and most practical method for the general hospital clinic. If attention is paid to keeping an unobstructed airway, there is no respiratory strain nor asphyxia, and the patient awakens promptly, in good condition.

Postoperative pneumonias. During the year 1915 there have been fifteen cases of pneumonia in 1,413 operations, or 1.06 per cent. Of these fifteen cases seven ended fatally; a mortality from pneumonia of 46.6 per cent., or a total mortality of 0.5 per cent. In order to study and analyze these cases, a brief résumé of the history and operations performed is given. First, the fatal cases will be considered.

Case I (appendicitis with general peritonitis). A child of fourteen years had been sick three days before operation; appendicectomy and drainage under gas and ether anesthesia; time, forty minutes. Death on third day. A right lower lobar pneumonia. In this case the pneumonia was probably a manifestation of a general septicemia with the anesthesia as the exciting agent.

Case II (acute appendicitis with general peritonitis). A child eight years old, onset six days before admission. At operation the abdomen was full of pus and the child was critically ill. She continued drainage very slowly until the fifteenth day, when she had sudden pains in the right chest, with bloody expectoration, all the clinical and physical signs of a pulmonary embolus. Following this, she developed signs of a lobar pneumonia and died on the twenty-fourth day.

Case III (typhoid appendicitis). Child eight years old, onset two weeks before admission; malaise, fever, acute right sided abdominal pain twenty-four hours before admission. Had vomited once. Lungs negative. Few marks suspicious of rose spots. Spleen palpable. Mass in right lower quadrant; extreme tenderness; moderate rigidity. White cells, 7,000. Polymorphonuclear eighty per cent., mononuclear twenty per cent. At operation a small gangrenous area over an ulcer in the jejunum. Cecum and appendix markedly indurated (evidently the mass felt upon palpation). Appendix removed, reenforcing suture over ulcer. Ethyl chloride and ether anesthesia. Time, thirty-five minutes. Pathological report showed typhoid appendicitis. Lobar pneumonia fourth day. Died eighth day.

Case IV. Man, thirty-five years old. Exploratory laparotomy for ruptured gastric ulcer with general peritonitis. Duration twenty-four hours before admission. Abdomen found full of fluid. No ulcer found on anterior surface of stomach. Patient too ill to proceed further. Drainage. Anesthesia, novocaine one per cent., and gas and oxygen after opening abdomen, time forty minutes. Patient did fairly well for a time, but drained profusely, then developed a subphrenic abscess. This was drained by the transpleural route, after having waited for thirty-six hours for adhesions of the pleura to form. He developed a suppurative pleurisy and later a pneumonia. Death was due to edema of lungs.

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*Read before the Women's Medical Association of New York City. From the Second Surgical Division of the New York Hospital, 1915, with a Report of Endotracheal Cases to Date.

[1]Read before the Surgical Section, Academy of Medicine, April 12, 1916.

Case V. Woman, aged thirty-eight years. Oophorectomy for ovarian cyst. Double salpingectomy for pyosalpinx. Gas and ether, duration forty-five minutes. Left table in good condition. Died second day with signs of lobar pneumonia. Urine negative.

Case VI (acute cholecystitis). Woman, aged thirty-eight years. Enormously fat. Cholecystostomy. Anesthesia, gas and ether changed to chloroform. Patient choked and coughed a good deal and was never thoroughly relaxed. First day signs of dullness and bronchial breathing right lower base. Died on second day.

Case VII (strangulated inguinal hernia). Man, fifty-six years old. Irreducible hernia, twenty-nine hours obstruction, vomiting, etc. Few coarse, moist rales at both bases posteriorly. Herniotomy. Gas and ether, duration thirty-five minutes. Contracted lobar pneumonia first day, died the third.

A summary of these seven cases shows three deaths following general peritonitis. Of these three cases, one was fatal at the end of the third day, one on the twenty-fourth day, of pneumonia, secondary to pulmonary embolus, and the other died of a pneumonia secondary to a suppurative pleurisy, due to a subphrenic abscess.

The other four cases, those of typhoid appendicitis, strangulated inguinal hernia, pelvic inflammatory disease, and cholecystitis, should have been avoided.

The diagnosis of the eight cases that ended in recovery were: Chronic appendicitis, 3 cases; ventral hernia, 1 case; gastrostomy for carcinoma of esophagus, 1 case; inguinal hernia and hypertrophied tonsils, 1 case; inguinal hernia, 1 case; cholelithiasis, 1 case.

Two were lobar pneumonia and six bronchial pneumonia. Onset: First day, three cases, and one each on the second, third, fourth, fifth, and eighth days. All persisted four to eight days and subsided by lysis. X-ray taken in two cases showed signs like tuberculosis.

The entire series of fifteen cases classified according to pathological lesions is as follows: Appendicitis, 5 cases; typhoid appendicitis, 1 case; inguinal hernia, 2 cases; strangulated inguinal hernia, 1 case; ventral hernia, 1 case; carcinoma of esophagus, 1 case; pelvic inflammatory disease, 1 case; peritonitis with ruptured gastric ulcer, 1 case; cholecystitis, 2 cases.

It will be noticed that every case was a laparotomy. Age: Youngest, four, eldest, sixty-two years. Six varied btween thirty-four and thirty-eight years. Time of operation: Shortest, fifteen minutes; longest, one hour. Average, thirty-six minutes.

Onset: Earliest, first day; latest, fifteenth day. Season of year; three occurred in March, three in August, one each in the other months, therefore the time of year did not seem to be a factor. Ten occurred in the cold months and five in summer.

Conclusion: 46.6 per cent. of our pneumonia cases were fatal. Three of these cases were in severe peritonitis and the pneumonias may have been of the terminal type.

The anestheisa in eleven cases was gas and ether, Bennett inhaler, followed by the drop method. Ethyl chloride and ether, 2 cases; gas and ether followed by chloroform, 1 case; local, novocaine, followed by gas and oxygen, 1 case.

The bacteriology of this series has not been studied. The study of the bacteriology in Doctor Whipple's paper has been most instructive, and will tend to clear up the disputed question of whether the postanesthetic bronchopneumonias are true bronchopneumonias or multiple infarcts. In our series we had two cases where the *x*-ray report was returned "suspicious of tuberculosis." Both cases later cleared up. It seemed probable that the shadows seen were multiple infarcts, rather than bronchopneumonia. If the same organism found in the mouth is later identified as the cause of the pulmonary infection, it will suggest that the lesion is a bronchopneumonia. We have *x*-rayed our patients that had unexplained high temperatures, provided that they were in condition to move, but have not considered it advisable to *x*-ray patients with positive physical signs.

Improper Clothing During Anesthesia.

One of the greatest factors in the etiology of postoperative pneumonias is the operative night gown. Many of the patients entering a hospital are accustomed to sleep in heavy woolen or flannel underwear. After entering the hospital they are forced to wear these light muslin gowns split open in the back. When they are on the operating table, there is often only a couple of layers of cotton between the metal operating table and their unprotected backs. During the recovery from the anesthetic, although wrapped in blankets, they may thresh around enough again to expose their backs. There should be undershirts of different weights provided by the hospital, so that the body heat of a patient may be protected until he is well out of the influence of the anesthetic.

Endotracheal Cases 115.

As this is a comparatively modern method of anesthesia, being first used on the human being by Elsberg, in 1910, it seems important that all cases should be recorded in order that a correct estimate may be formed of the safety of the method as well as its special indications.

The apparatus used in the New York Hospital is the Janeway, which is kept on a table specially made for it, with a closed compartment below, containing all the necessary appliances. In this way the whole apparatus can be wheeled from room to room. It has the advantage over some similar machines, that it runs without noise and so does not disturb the operator.

The Jackson direct laryngoscope and silk woven catheters are used. The patient is placed in position for operation and a small sandbag is placed under the shoulders fully to extend the head, allowing the catheter to be placed while the patient is being painted and draped; thereby time is saved. A little more time is required than with the inhalation method, however, as the patient has to be deeply anesthetized in order to insure success in intubation, and this is one reason why we have not used the method more frequently. In the beginning we used it in all kinds of cases to try out the apparatus and gain skill in intubation.

This series of 115 cases, therefore, represents a great variety of general surgical operations: for repair of hernia, 22; 11 for cervical adenitis, 12 for appendicitis, 4 for gallstones, 15 other laparotomies, 14 thyroidectomies, 2 brain cases, 2 laryngectomies, 3 resections of the jaw, 4 thoracotomies, 1 resection of cervial rib, 1 resection of portion of sternum, 4 fracture cases, 1 prostatectomy, etc. They were most of them fairly long operations, 87 lasting half an hour or more. Of these, 46 lasted one hour or more, 4 being two and one half hours and over. The longest operations for an old fracture of both bones of forearm near the elbow—lasted two hours and fifty-five minutes, with the patient in good condition at the end. Only three cases lasted ten minutes or less.

Preliminary medication was given in only seven cases. Relaxation was with one or two exceptions perfect, with a lighter degree of anesthesia than with inhalation. There was very little vomiting and no throat irritation.

In a few cases, notably some goitre cases, there was a good deal of mucous secretion during anesthesia, but no aftereffects were noted as a result. One patient undergoing amputation of the tongue acquired pneumonia and died on the third day; and one patient with much hemorrhage, undergoing a tedious resection of the superior maxilla for carcinoma, died from shock within a few hours of the operation.

We consider the method especially indicated for intrathoracic work and operations upon the head and neck, where it is inconvenient for the surgeon and anesthetist to occupy the same field. In thyroidectomies it is particularly useful, because respiration is not interfered with when the trachea is pulled upon, nor can the trachea be compressed while the catheter is *in situ;* also for cases of extensive cervical adenitis where there is apt to be more or less disturbance with breathing.

It has been stated that pharngeal insufflation is just as good and much easier of accomplishment, but, while it may be satisfactory in the majority of cases, it is not always absolutely smooth, as the catheters may become clogged with mucous and blood, if the operation is in the mouth, and the air-way may not be entirely free; whereas in the endotracheal method we know where the ether vapor is going all the time; and the method certainly has a place in thoracic surgery, brain surgery, and for lengthy operations about the head and neck.

224 East Fifteenth Street.

Quarterly Index

Of the Current Literature of Anesthesia and Analgesia.

EDITOR'S NOTE: Authors of pertinent articles, who desire to have them indexed and abstracted, are cordially invited to send copies of the journals containing their contributions, direct to the editor, immediately on publication. Also the receipt of reprints for filing and reference will be duly appreciated.

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